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People & the Planet

Volume 5 Number 1

PEOPLE AND MOUNTAINS: PINNACLES OF DIVERSITY

Front cover: Pakistan's forest cover is shrinking by more than one per cent each year.
Credit: Z. Ahamad/IUCN
Left Moonrise over Everest range,Nepal.
Credit: Jeremy Horner/Hutchison Library

People & the Planet

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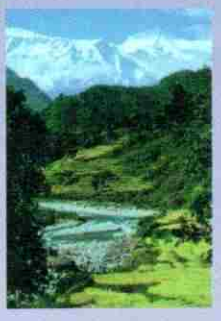

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Pinnacles of diversity

While one person in ten of the planet's growing population are mountain dwellers, the other nine are only vaguely aware of how much they owe to the mountains for food, hydro-electricity, timber, mineral resources and, above all, water. Nor is there much awareness of the biological and cultural richness which is stored in these pinnacles of diversity. And where knowledge is lacking, there is a terrible danger that these riches will be mindlessly exploited and tragically lost.

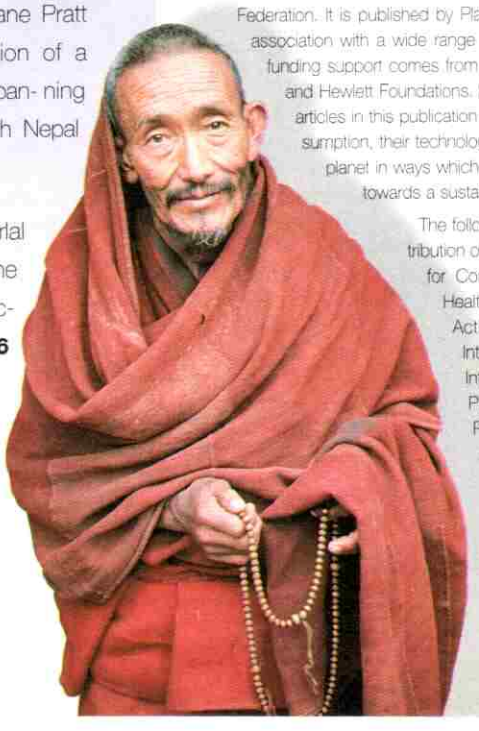
The problem is partly one of geography. Despite the call of the hills, most plainsmen do not know or experience the world that is far above them, hard to reach or understand. The problem is also one of professional bias. Ecologists and anthropologists do not make investment decisions. Economists and engineers do, and they rarely give much thought to environmental protection and cultural integrity.

Fortunately, there are some signs of change. As we report, the World Bank has had second thoughts about investing in the Arun Dam in Nepal, and its support for small-scale loans shows that it is moving to invest in people. UNEP's Biodiversity Assessment, also reported here, will help concentrate minds on critical areas of endemism, many of them in mountains. Our reports on successful mountain projects by remarkable individuals also give some grounds for hope. But, as Derek Denniston makes clear a much greater effort will be needed if mountains and people are to be brought into harmony.

The NGO Mountain Forum, which he reports on, is one positive step in mobilizing a better understanding of the issues. Hopefully, this issue of *People & the Planet*, in its new design, will also make a small contribution to meeting that need. With the generous help of the Swiss Development Cooperation and the Mountain Institute, we plan to reach out to an even larger readership than usual. **John Rowley**

People & the Planet is jointly sponsored by the United Nations Population Fund, the World Conservation Union, the World Wide Fund for Nature, and the International Planned Parenthood Federation. It is published by Planet 21, an independent, non-profit publishing company in association with a wide range of international non governmental organizations. Additional funding support comes from the governments of Sweden and Denmark and the Turner and Hewlett Foundations. None of the sponsors or supporters takes responsibility for articles in this publication. All are united, however, in the belief that people, their consumption, their technologies and their numbers, interact with the environment of our planet in ways which need to be explored – and that a path needs to be traced towards a sustainable future for healthy people living in a healthy world.

The following 'associates' are partners in the development and distribution of *People & the Planet*: AVSC International, Audubon, Center for Communication Programs, John Hopkins School of Public Health, Earthwatch, Center for Development and Population Activities, Family Health International, Futures Group, International Institute for Environment and Development, International Union for the Scientific Study of Population, Pathfinder International, Population Action International, Population Concern, Population Reference Bureau, Royal Swedish Academy of Sciences, Television Trust for the Environment, WWF-Alliance for Religions and Conservation.



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newsfile

A VOICE FOR WIDOWS

Jenny Matthews

One positive outcome of the NGO Forum at the Fourth World Women's Conference in Huarou, outside Beijing, in September, was the birth of a new international initiative to promote the cause of widows.

This followed an international workshop which discussed the grave implications of the low status – in law, religion, traditions and society – of the millions of women who are widows. It dealt with the causes and consequences of their extreme marginalization, poverty and vulnerability for development and society as a whole.

The meeting, which was supported by Planet 21, publishers of this magazine, and the Swedish International Development Agency (SIDA), heard widows speak eloquently of physical violence, property grabbing and degrading mourning rites often involving sexual activities.

It heard successful examples of widows organizations in South Asia and Africa, and attention was drawn to ways in which the Women's Convention (CEDAW) could be invoked to protect their persons and property and encourage acknowledgement of their economic contribution to the community.

The workshop drew on other national and regional Forum panels which discussed aspects of widowhood and, for the first time, discussed the treatment of widows in the context of international human rights norms and treaties. Too often widows do not enjoy fundamental human rights to life, shelter, food, health or livelihood. They are forced to live in the shadows, easily exploited, their children's future equally endangered.

It was resolved that widows now need an international voice, linking the many local groups which have recently sprung up, through the development an international NGO. The name for this is Empowering Widows in Development (EWD), and funding is being sought from a consortium of donor agencies.

All those interested in EWD should contact Margaret Owen at 36 Faroe Road, London W14 OEP, UK. e-mail:100066.1321 @compuserve.com
Margaret Owen is the author of a forthcoming book *The World of Widows* to be published this year by Zed Books.
Research funding for this has been provided by SIDA in collaboration with Planet 21.

AMAZON ROADS

Concern is growing over plans by the Brazilian Government to build four major highways through the Amazon rainforest.

One of these will extend the BR 364 highway through to the Pacific. Another would open up an all-year road to Venezuela and the Caribbean coast. Other schemes would involve paving more of the transamazon highway and extending it to the south.

All these plans are part of the so- called Amazon Charter, signed by Brazilian President, Fernando Enrique Cardoso, and nine state governors last April.

Farmers, ranchers, lumber merchants and regional governors welcomed the Charter which would lead to huge savings in the current export route via the Atlantic ports and the Panama Canal to Pacific markets. It would also bring hydro energy from Venezuela to Manaus, provide an export route for southern soya bean plantations and open up the Amazonas state to logging.

But environmental campaigners are concerned that such developments could repeat the ecological and social damage of previous road schemes if they are not carried out with great care.

According to local Greenpeace campaigner, Anna Fanzeres, the governor of the state of Amazonas, Amazino Mendes "has a lot at stake. He's been offering incentives to loggers from other states to come to Amazonas, attracting mineral companies and aiming at a massive export industry from Manaus."

Greenpeace Brazil also points out that the proposed development policy for the region is not compatible with the Biodiversity Convention once it is signed by the Brazilian Government and sits oddly with the Government's pilot programme to preserve tropical forests, which receives funding support from the G7 countries.

"Brazil has enough experience with negative impacts of large scale development schemes in the region (hydro dams, roads, mining, predatory logging) to know that pursuing this line of development we are going to lose the immense biodiversity reservoir that is Amazonia," said Anna Fanzeres.

President Cardoso, in justifying the coast-to-coast highway, said that his aim was to balance economic and technological development with respect for the environment. This would involve relocating Indians to 50 reservations, which it appears that Germany has offered to finance. Where the funds needed to build these highways will come from remains unclear.

Andre Bartschi/Still Pictures

WORLD BANK SHIFT

The Washington-based World Bank and other international aid donors have launched a Consultative Group to Assist the Poorest (CGAP) to provide more than $200 million in backing to institutions that provide 'microloans' to the poor, *writes John Madeley*. The new group "will boost programmes around the world that have demonstrated that impoverished families can become self-supporting on loans as little as $100."

"Micro-level credit schemes help people to help themselves by starting small-scale income generation projects and businesses," says James Wolfensohn, President of the World Bank, which will house the CGAP Secretariat, "they are a particularly effective way of reaching women, thereby helping to improve the incomes and well-being of their children and their families."

Small loans have "helped millions lift themselves out of extreme poverty," says Ismail Serageldin, World Bank Vice President and newly elected Chairman of CGAP; "many have provided the basis for flourishing infant industries and family enterprises throughout the developing countries. The challenge is to reach many more of the very poor and to reach deeper to the poorest society."

Muhammad Yunus, President of the Grameen Bank, which pioneered lending to the rural poor in Bangladesh, described the initiative as "the most significant event in the world of micro-finance." Dr Yunus will chair a panel of experts in micro-finance that will advise CGAP.

The announcement of the new plan comes when the World Bank is seeking a replenishment of funds for its 'soft-loan' arm, the International Development Association. NGOs have strongly criticised the bank for not reaching the poor and for the environmental damage they allege that some of its projects have caused.

The Bank also appears to have listened to NGO protests in Nepal by scrapping its planned loan for the controversial Arun dam. Gopal Siwakoti of the Arun Concerned Group in Nepal said this was "an historic victory for Nepal and a crushing defeat for the management of the World Bank." The Arun dam would have cost one and a half times Nepal's annual budget. Critics argued that smaller hydro projects would be cheaper and could be built by using domestic finance and expertise.

An $11 billion plan to alleviate the multilateral debt burden of developing countries is being discussed by the World Bank, but has run into opposition from its sister organization, the International Monetary Fund.

SHARING THE RIVERS

Water sharing between countries is destined to become one of the most contentious international issues in the new millennium, as demand grows along with agricultural and industrial development and growing populations. Two rivers, the Mekong and the Euphrates, are likely to attract special attention in 1996.

The signing of the agreement for Co-operation in Sustainable Development of the Mekong River Basin, last year, opens the way for major dam and water diversion schemes, especially in Thailand where the demand for water is growing by more than 12 per cent a year. A report funded by UNDP advocates that six major dams should be constructed on the Mekong's main stem.

Of the other signatory states to the Mekong Agreement, Laos is looking to develop major hydro-electric projects, while Vietnam is seeking water both for irrigation and industrial needs. Cambodia's concern is largely to maintain its fishing industry.

Critics of the scheme warn that it could threaten rare marine species, reduce the supply of water into the Tonle Sap reservoir in Cambodia, decrease downstream fertility, increase flooding and salt water incursions, and even threaten the delta itself as the flow of silt is reduced.

Turkey's plans Other huge dams are planned in Turkey where the government's gigantic water schemes could eventually reduce the flow of the River Euphrates by between a third and a half.

Writing in *Middle East International*, Hugh Pope says that Turkey's determination to complete what will be the biggest engineering feat in history will have major consequences on downstream states. And a crisis is inevitable if no sense of co-operation can be fostered between the states of the Tigris-Euphrates basin, principally Turkey, Syria and Iraq.

Since April last year, the first stream of brown water has been flowing down a concrete-lined canal from Turkey's gigantic Southeast Anatolian Project (GAP) into the fields of the Harran plain. So far it is a mere 2 per cent of the flow of the Euphrates. But that is just the beginning.

Turkey has promised that it does not plan to take full advantage of the fact that it supplies 70 per cent of the waters of the Tigris-Euphrates basin. The head of the GAP, Olcay Unver, says he expects Turkey eventually to use about 11 cubic kilometres (km^3) of water, or about a third of the previous annual 31 km^3flow of the Euphrates.

What will hurt the Arab states downstream is that until now Turkey has made only superficial use of the water.

According to Nurit Kilot, Professor of Geography at Haifa University in Israel, Syria and Iraq at present use far more than Turkey, about 5 and 14 km^3 respectively. However, all three countries are currently planning irrigation and hydroelectric projects that would consume 41 km^3, about a third more than the total flow of the Euphrates alone.

Of a current estimated cost of $20 billion, $12 billion has been spent so far. Three of the 22 dams have been completed, including the centre piece of the project, the massive 1.6km-wide, 169-metre-high Ataturk Dam. Six other dams are under construction, and work on two more will start this year.

The case for cooperation on optimal use of this limited resource is further sharpened by the fact that by the time the water reaches Iraq, at least half will have been degraded by exposure to agricultural salts and chemicals. There is also the question of wastage through seepage and evaporation. Currently, the figure for wastage is 10 per cent but it could rise to 20 per cent by the time all the dams are finished.

If an all-round agreement cannot be reached, dammed-up lakes totalling the size of more than two years' flow of the Nile will eventually lie shrinking in the scorching Middle Eastern sun.

Hugh Pope's article was distributed by Third World Features.

BIODIVERSITY ASSESSED

The Earth's biological resources are under serious threat, according to the first Global Biodiversity Assessment report, issued by the UN Environment Programme (UNEP) in November.

The Assessment finds that ecosystems of all kinds are under pressure worldwide. Coastal and lowland areas, wetlands, native grasslands, and many types of forests and woodlands have been particularly affected or destroyed. For example, in the early to mid-1980s, humid tropical forests were losing nearly 25 million acres annually, or just under 1 per cent globally; dry tropical forests may have lost even more area. Of the 232,000 square miles of coral reefs in the world, about 10 per cent have already been eroded beyond recovery.

The report estimates that the total number of species on Earth is 13 to 14 million, of which only 13 per cent have been scientifically described. It also notes that the number of species that have been recorded as threatened with extinction – about 26,000 plants and 5,400 animals – is far from the real total. The status of most of the 1.75 million described species – let alone the many millions of undescribed species – has never been fully assessed. Flowering plants and vertebrate animals have recently become extinct at a rate estimated to be 50 to 100 times the average expected natural rate.

The report concludes that biodiversity management must go far beyond simply establishing isolated nature reserves or setting up agricultural seed banks. Instead, it must be fully integrated into all aspects of landscape management, including agriculture, socio-economics, and other relevant fields.

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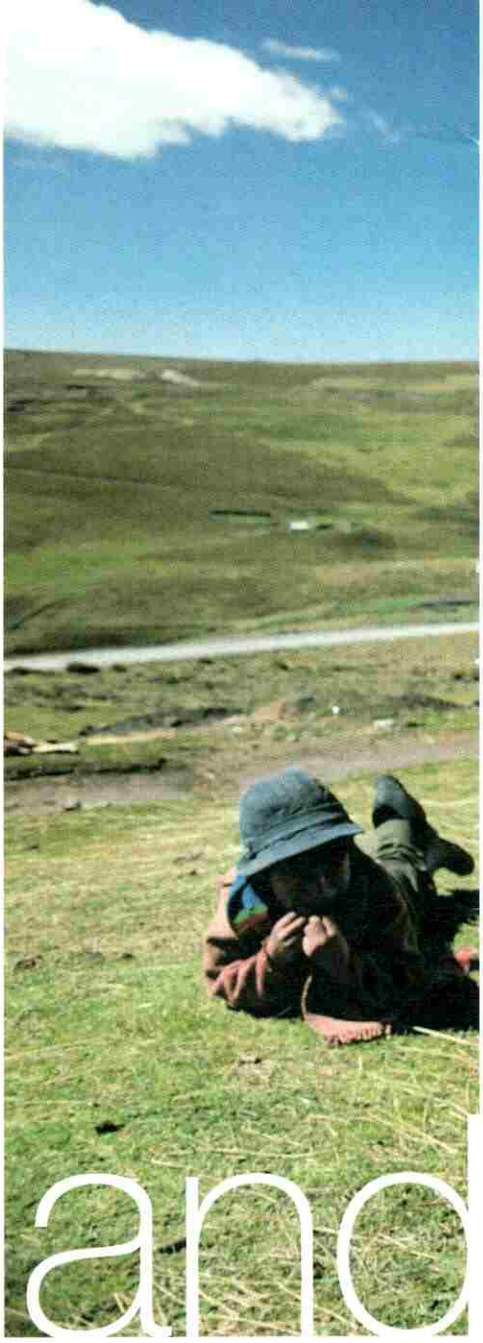
Tel: 254 2 62 3264, Fax: 254 2 62 3926.

The Mountain Institute

The future security of the planet's growing human population rests in great measure on the mountain watersheds of the world. Yet no part of the environment is so badly neglected by the policy-makers, says **Derek Denniston** in this wide-ranging overview.

Mountains make up one-fifth of the world's landscape and are home to at least one-tenth of the world's people. An additional 2 billion people depend on mountains for much of their food, hydroelectricity, timber, and mineral resources. Up to 80 per cent of the planet's fresh surface water comes from mountains. All told, fully half of the world's people, as well as a surprisingly large share of its biological diversity, rely on mountain watersheds for fresh water. In an era of increasing water scarcity, perhaps no category of the earth's major biomes has greater value for geo-political – not to mention environmental – security.



People and

In the deliberations of governments and organizations world wide, the fate of the mountains has been largely ignored. Unlike the oceans or tropical rain forests, mountains have never had their own scientific discipline, or even a movement to broadcast the grave threats facing them and their peoples, such as Jacques Cousteau has fostered for the oceans.

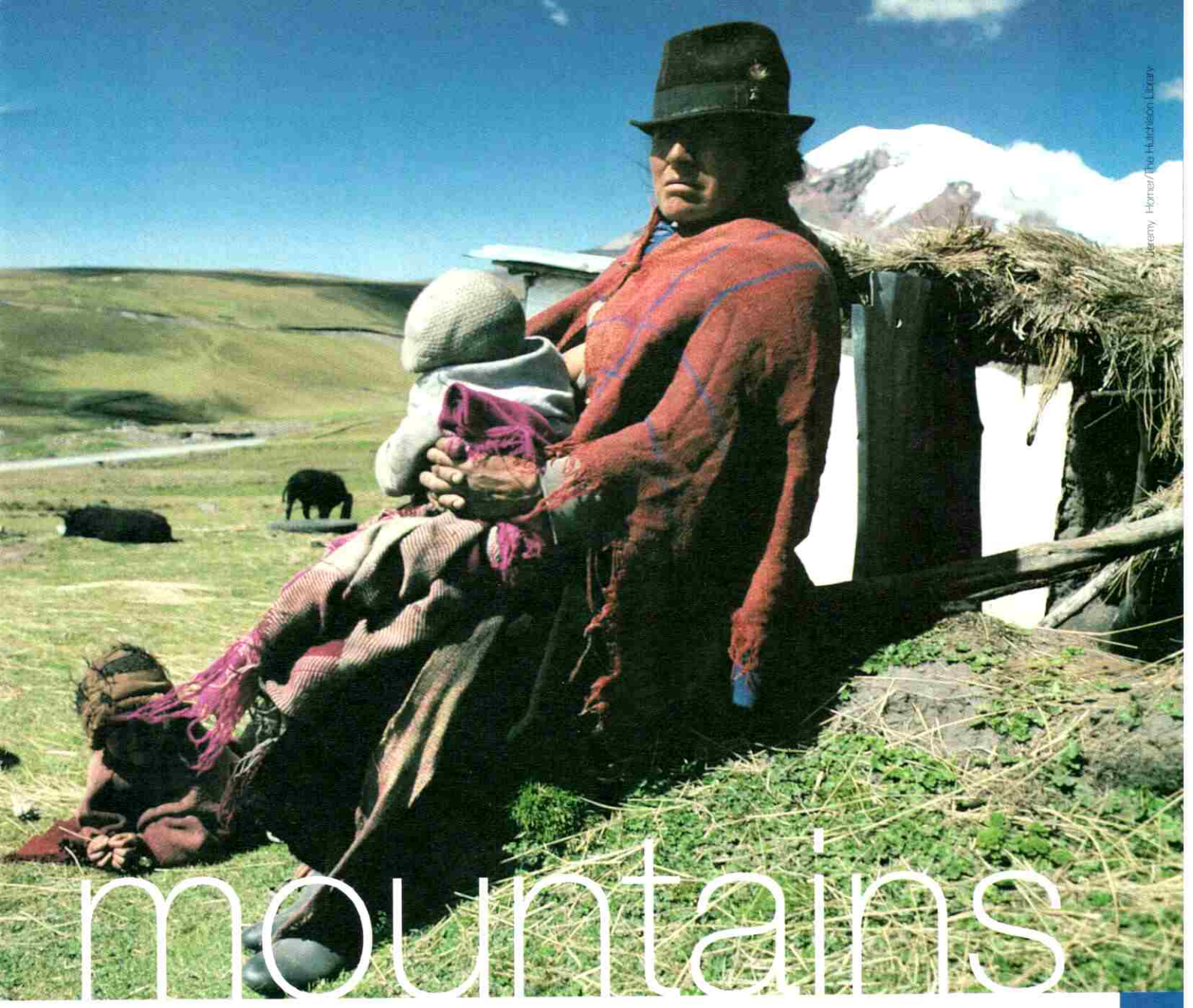
In the surrounding lowlands, millennia of intensive human use have led to steadily increasing biological impoverishment and cultural homogenization. Mountain peoples, in their vertical archipelagos of human and natural variety, have become the guardians of irreplaceable global assets. All over the world, expanding economic pressures are degrading mountain ecosystems, while confronting mountain peoples with increasing cultural assimilation, debilitating poverty, and political disempowerment.

Mountains and high plateaux occur on every altitude and terrestrial latitude. Of the world's current roster of 185 countries, only 46 have no mountains or high plateaux – and most of those are small island nations. About half of the world's mountain peoples are concentrated in the Andes, the Hengduan-Himalaya-Hindu Kush system, and dispersed African mountains. In contrast with the sparse populations of Northern mountains, portions of some tropical ranges – such as parts of Mount Kenya, the highlands of Papua New Guinea, the Vale of Peshawar in northern Pakistan, and the Virunga volcano region of Rwanda – have more than 400 people per square kilometre.

Whether in cloud forests or alpine grasslands, on windswept promontories or along glacier-fed streams, what mountain ecosystems have in common is the combined effects of rapid changes in altitude, climate, soil, and vegetation over short distances. Biologically, their high diversity – including prolific concentrations of species found nowhere else – leaves them vulnerable to losses of whole plant or animal communities. And culturally, the fact that most mountain peoples are ethnic minorities, outside the dominant cultures of the plains, leaves their regions poorly represented in the centres of political or commercial power where much of their fate is determined.

The complexity of mountain topography leads to comparable variety in vegetation and animal life. In fact, one of the most defining ecological characteristics of mountains is that the rise in elevation is sufficient to produce belts, or zones, of differing climates, soils, and vegetation. One recent geographic analysis shows 23 per cent of the earth's landscape with this characteristic. Within the numerous altitudinal belts of ecosystems in California's Sierra Nevada range, for example, are found an estimated 10,000 to 15,000 species of plants and animals.

Mountains also rank high by another indicator of biodiversity: endemism, the



mountains

occurrence of species only within narrow ranges, typically after centuries or longer of isolation. Birds are excellent biological indicators because they occur in all regions, respond swiftly to environmental change, and are among the best monitored and understood creatures. Birds with restricted habitats tend to occur together in isolated patches of habitat, particularly montane forests. Of the world's 247 endemic bird areas, 131 occur in tropical mountain.

Mountain people

Because mountains tend to be challenging environments in which to produce a living, and are often inaccessible, they have provided sanctuary to refugees, indigenous peoples, and ethnic minorities. Mountain people typically live on the economic margins as nomads, part-time hunters and foragers, traders, small farmers and herders, loggers, miners, wage workers, or in households headed by women while men pursue seasonal work elsewhere.

Given the imperative to survive, mountain people have acquired unique knowledge and skills by adapting to the specific constraints and advantages of their fragile, inhospitable environments. They possess millennia of experience in shifting cultivation, terraced fields, medicinal use of native plants, migratory grazing, and sustainable harvesting of food, fodder, and fuel from forests. In India's Garhwal Himalaya, for example, local women recently were able to identify 145 species of plants that had been destroyed by commercial logging and limestone mining in the area, whereas national foresters could list only 25.

With human survival so closely dependent on knowledge of local ecology, the existence of sharp differences in the kinds of native foods, fuels, or medicines that can be found or grown in different parts of a single mountain

Above: Mountain woman of Chimborazo, Ecuador. Mountain peoples are the guardians of these fragile environments.

Below: Clearcutting near Seattle, USA, is putting pressure on timber resources in the adjoining national forest.

Daniel Dancer/ Still Pictures

Jeremy Horner/The Hutchison Library

Left: Planting potatoes in Chimborazo, Ecuador. Mountain farmers have developed unique skills to survive in their challenging environments.

range can result in similarly sharp differences in the knowledge – and hence the culture – of that range's human inhabitants. "Cultural diversity is not an historical accident. It is the direct outcome of the local people learning to live in harmony with the mountains' extraordinary biological diversity," says Anil Agarwal, founder and director of the Centre for Science and Environment in New Delhi. These two types of diversity – biological and cultural – are inextricably linked. For instance, more than 10 million Quechua peasants, descendants of the Incas, now reside in the central Andes of Bolivia, Ecuador, and Peru, one of the most biologically diverse regions on Earth. Altogether, the world's mountains are home to several thousand different tribes or ethnic groups.

For all their differences, however, one attribute most mountain peoples share is material poverty. More than 60 per cent of the rural Andean population lives in extreme poverty, and most of the 98 million Chinese considered to be among the world's "absolute poor" are ethnic minorities who live in mountains. (However, these statistics fail to reflect the value of two institutions common to mountain villages – barter trade and communal property, such as forests and pastures.)

The forceful combination of political marginalization and poverty has subjected mountain peoples to widespread discrimination by powerful lowlanders, who refer to them with such pejoratives as "hillbillies" (United States), "oberwalder" (Austria), "kohestani" (Afghanistan), and "bhotias" (India). This discrimination can extend to violent human rights abuses – especially of ethnic minorities resisting political control by national governments. Prominent examples include Tibetans, Kashmiris, Kurds, Irian Jayans, and other minorities in Bhutan, Bosnia, Burundi, Colombia, Guatemala, Malawi, Peru, the Philippines, and Sri Lanka. In 1993, of 34 major armed conflicts taking place in 28 countries, 22 took place primarily in mountains, and another 8 included such areas.

Damaging policies

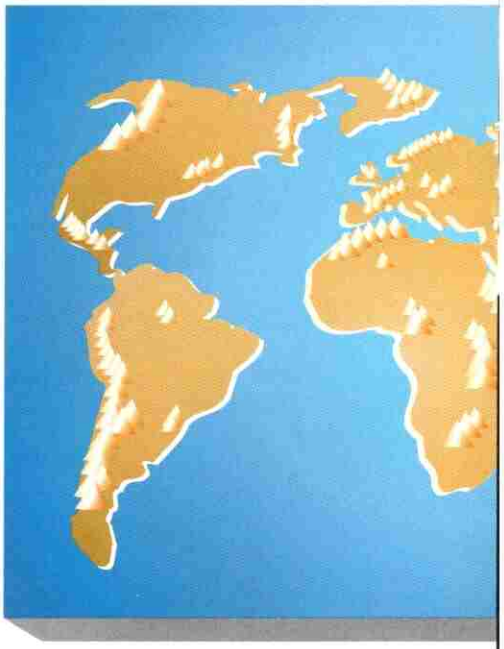
In many developing countries, development policies have actually undermined peasant agriculture rather than aiding it, and have left mountain farm communities enmeshed in interlocked webs of expanding population, declining resources, and increasing poverty and environmental degradation. This degradation has become visible in several trends over the last half century: landslides have become larger and more frequent; water flows in traditional irrigation systems have fallen; and yields of major crops have not kept pace with the gains typically achieved in the plains. The genetic diversity of crops and livestock has been diminished, as has the diversity of flora in forests and pastures. The regenerative capability of the land, based on intricate linkages between various land uses, has been weakened. The periods of hunger between harvests have lengthened; more time is spent collecting fodder and fuel; and the rates of poverty, unemployment, and migration out of the hills have generally increased.

Highly concentrated ownership of the more fertile and productive arable land in the plains creates pressures for growing populations to migrate and clear more marginal land on hillsides. In the mountainous countries of Guatemala, Ecuador, and Peru, nearly 90 per cent of the farms are minifundios, often too small to provide an adequate income. At the other end of the spectrum, latifundios (large land holdings) control over 80 per cent of the occupied land in Chile and 40 to 50 per cent in Colombia, Ecuador, and Guatemala. Lack of secure access to natural resources continues to drive mountain peasants throughout the world uphill onto less stable soils, or downhill to the cities and lowlands.

In most mountain countries, economic development policies have led to the expropriation of customary land rights and their redistribution to a range of vested commercial interests. With the help of roads, bridges, and tunnels, these industries have transformed mountains into steep storehouses of timber, water, hydroelectricity, minerals, and meat for export to the plains. Extractive industries, commercial operations, and large-scale interventions – especially large mines and hydropower projects – often cause exceptional damage in mountains because they ignore the fragility of ecosystems and the rights of local communities.

Forest destruction is moving up mountain slopes in most tropical countries. In a recent assessment of tropical forests, the U.N. Food and Agriculture Organization (FAO) found that during the last decade, tropical mountain forests have had the fastest rates of both annual population growth and deforestation. The Guatemalan Highlands and the Bolivian Altiplano are two clear examples of the causal linkage between high population growth and severe deforestation.

In industrial countries, mass tourism and recreation are now fast overtaking the extractive industries as the largest threat to mountain communities and environments. Since 1945, visits to the 10 most popular mountainous national parks in the United States have increased twelvefold. In the European



Alps, tourism now exceeds 100 million visitor-days. Every year in the Indian Himalaya, more than 250,000 Hindu pilgrims, 25,000 trekkers, and 75 mountaineering expeditions climb to the sacred source of the Ganges River, the Gangotri Glacier. They deplete local forests for firewood, trample riparian vegetation, and strew litter. Even worse, this tourism frequently induces poorly planned, land-intensive development.

Parks and projects

More than a century ago in New Zealand, Maori people feared exploitation of sacred peaks by European sheep farmers and other colonists. They devised an ingenious solution: the Tongariro Mountains were given to Queen Victoria, and New Zealand's first national park was created. Globally, approximately 8 per cent of all mountains are protected in some form. But this total figure distorts the actual level of protection because it includes the 97 million-hectare Green- land National Park. On average, mountain protected areas are larger than those found in the lowlands, but there are wide variations in the degree of protection. For example, 70 per cent of New Zealand's Southern Alps is protected, making them the most fully protected range in the world. By contrast, only 2.6 per cent of the Alps is protected. Other under-represented areas include the Atlas range, the Hindu Kush, Papua New Guinea, the Sredinnyi Ridge in Kamchatka, and the mountains of Laos, Myanmar (Burma), and Vietnam.

Right: Traditional pottery fair at Tiobamba, Peru.

Below: A Wall Creeper. A mountain bird of the Swiss Alps.

In response to the complex threats to mountain communities and environments, non-governmental organizations have pioneered integrated approaches to conservation and development that combine the goals of biological conservation with equity, empowerment, indigenous rights, and local control of natural resources. These projects typically return control of local mountain forests, fields, and ranges to local communities, while giving them the incentives and means to achieve resource practices that are sustainable.

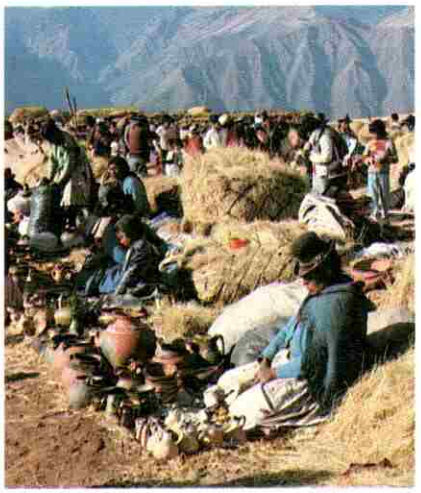
A common lesson from all of these community projects is that the great diversity of mountain ecosystems, cultures, and adaptive strategies requires a long-term commitment of personnel in order to develop effective programmes. Project staff need time and training to understand local ecosystems and stresses, existing natural resource management strategies, cultural mores, community structure, and gender roles. Far from a panacea for their intended beneficiaries, these projects are best characterized as complex and time-consuming experiments in reconciling the fundamentally distinct – and often conflicting – goals of conservation and development.

Local approaches

Many projects have failed to focus on the critical linkage between these two goals. But by valuing the tremendous diversity, limited production scale, and vulnerability of mountain environments, these community-based initiatives have established viable prototypes for integrating economic vitality and ecological resiliency. The key will be an array of local approaches, informed by lessons learned in other places and supported by the right policies at higher levels.

To elevate the status of mountain peoples and conserve their ecosystems, national governments and international development agencies will need to focus on policy reform in six areas: promoting efforts to secure land tenure or control over local resources; reducing the impacts of livestock, timber, hydropower, and minerals production in mountains; creating regional networks of conservation areas; improving knowledge about mountains through integrated research, social and environmental monitoring, and public education; establishing institutions and cooperative agreements for each major range; and integrating mountains into the projects and policies of development agencies.

To help move mountain issues from our mental margins to the mainstream, mountain NGOs recently formed the



The Cuischaca Trust

Mountain Forum. The principal role of this global umbrella group is to exchange ideas, experiences, and people; raise mountain issues on local, regional, national, and international agendas; and promote policies for conservation and equitable, ecologically sustainable mountain development. One of the first activities of the Forum will be launching an electronic network for mountain issues.

The challenges confronting mountain communities and ecosystems are immense. Surmounting them will require decades of sustained resolve. If the world's highest mountains have been able to inspire extraordinary fortitude and ingenuity within the climbers drawn to their summits, then the fragile ecosystems and endangered cultures from which these pinnacles rise now merit no lesser commitment.

Derek Denniston is author of *High Priorities: Conserving Mountain Ecosystems and Cultures*, Worldwatch Paper 123 and co-author of *State of the World 1995*, W.W. Norton, New York. *High Priorities* is available from the Worldwatch Institute, 1776 Massachusetts Avenue, N.W., Washington, D.C. 20036-1904 USA; Telephone: 001-202-452-1999; Fax: 001-202-296-7365; e-mail: wwpub@igc.apc.org.

To learn more about the Mountain Forum, contact: The Mountain Institute, Main & Dogwood Streets, P.O. Box 907, Franklin, W V 26807, USA; Telephone: 001-304-358-2401; Fax: 001-304-358-2400; e-mail:summit@igc.apc.org.

Eugene Hutchinson/WWF

In many societies mountains are seen as sacred places. As such, they can have a significant impact on the cohesion of local cultures and on the conservation of the environment, as **Edwin Bernbaum** explains.

Secrets of t

Sacred mountains highlight the key role that culture plays in influencing how people regard and treat the environment. As the highest and most impressive features of the landscape, mountains tend to reflect the highest and most central values and beliefs of societies and traditions around the world.

These values and beliefs determine to a great extent which natural resources people seek to exploit and which features of the land they strive to protect. Many indigenous cultures draw vitality and cohesion from their relationship to mountains and other sacred features of the landscape. Destroying what makes such a site sacred may undermine a culture, resulting in negative social, economic, and environmental impacts as the society falls apart and traditional controls of land are lost

Although in most traditions the sacred itself is ultimately indefinable, it is not amorphous. People experience the sacred nature of mountains, in particular, through the views they have of them, such as the mountain as the temple of the gods, centre of the universe, or abode of the dead.

The power of many mountains comes from the perception of them as dwelling places of deities, often regarded as protectors of local communities.

The Sherpas of Khumbu in Nepal, for example, view the craggy, fortress-like peak of Khumbila as the seat of the warrior god who watches over their homeland and protects their yaks. Actions that would make such a mountain unsuitable as the abode of its deity – appearing to drive the god, spirit, or ancestor away – may leave nearby villagers feeling vulnerable.

Another widespread theme is that of the mountain as centre. A number of mountains in Asia, such as Mount Kailas in Tibet and Gunung Agung in Bali, take on the character of the mythical Mount Meru or Sumeru, which stands as a cosmic axis around which the universe is organized in Hindu and Buddhist cosmology. Such mountains help to orient people and give them a sense of their place in the world.

People tend to look up to the heights as sources of blessings – most notably, water, fertility, life, and healing. Mountains such as Ausangate in Peru, Tlaloc in Mexico, and the San Francisco Peaks in Arizona are revered as abodes of weather deities, places of springs, and reservoirs of waters on which societies depend for their wellbeing and existence.

Shamans in Japan and Korea, many of them women, climb sacred mountains to charge themselves with healing powers and perform rituals for their patients. The leading spiritual doctor of the Wintun tribe in northern California feels that she gets her power to teach and heal from the great volcanic peak of Mount Shasta.

Another major theme is that of mountains as divine ancestors and places of the dead, often involved in origin myths. The forested summit plateau of Mount Koya in Japan has one of the most impressive graveyards in Japan while the spirits of the dead were traditionally thought to go to the foot of Tai Shan, historically the most important of China's many sacred peaks. East Africans traditionally buried their dead facing sacred mountains like Kilimanjaro and Mount Kenya.

Finally, mountains are frequently seen as places of spiritual revelation and transformation. Mount Sinai occupies a position of particular prominence in the Bible as the fiery site where God revealed the Torah, the basic teaching of Judaism, and the Ten Commandments, the basis of law and

Left: A Buddhist lama, Tibet.

Right: Mountain view of Huaráz, Peru.

Below: Badrinath Temple, India.

Kerstin Rodgers/The Hutchison Library

he sacred hills

ethics in Western civilization. The granite cliffs and knife-edge ridges of Hua Shan, the most spectacular of the five principal sacred peaks of China, are a favourite haunt of Taoist hermits intent on transforming themselves into immortals.

Many people today, both traditional and modern, seek out mountains as places of spiritual renewal and refreshment. Kuo Hsi, one of China's greatest landscape painters wrote, "The din of the dusty world and the locked-in-ness of human habitations are what human nature habitually abhors; while, on the contrary, haze, mist, and the haunting spirits of the mountains are what human nature seeks."

In the United States John Muir, a major figure in the genesis of the environmental movement, founded the Sierra Club primarily to preserve the Sierra Nevada as a place where people could go for spiritual and physical renewal. Such motivations continue to inspire interest and membership in wilderness conservation organizations today.

For many, the environment is not just the natural environment. It includes cultural and spiritual components that make it meaningful – a source of life in its deepest and broadest sense. People who do rituals to draw water from a sacred mountain, for example, do not view the water and mountain simply as physical parts of the ecosystem needed to grow their crops. They see them as essential components of a larger system of meaning, expressions of deeper reality that sustains them spiritually and culturally, as well as physically.

All this suggests that we adopt a broader approach to sustainable use, taking into account spiritual and cultural, as well as economic and ecological factors. Measures taken to preserve the natural ecology of a site without regard for what it enshrines may kill the spirit of the place, destroying its value for the local people who depend on it for the continued vitality of their society and traditions.

Just as we need to preserve biodiversity for its own sake and for the benefits it can bring, such as new pharmaceuticals, so we need to preserve cultural diversity for its intrinsic, human value and for the traditional knowledge and fresh points of view it can contribute.

Dr Edwin Bernbaum is a research associate at the University of California, Berkeley and a member of the Commission on National Parks and Protected Areas of the World Conservation Union (IUCN).

Pilgrims plant a forest

In 1993 Professor A.N. Purohit, a plant physiologist, visited Badrinath, the major Hindu pilgrimage shrine in the Indian Himalaya, and noticed how the surrounding slopes had been stripped bare of forest. Over 350,000 pilgrims a year come to Badrinath from all over India, arriving on roads built in the early 1960s. Their influx has had both good and bad impacts. Purohit decided to see if the Head Priest of the temple would use his religious authority to encourage pilgrims to plant trees for restoration of the site.

Greatly excited by the idea, the Head Priest said he would set a date for the joint undertaking. On the appointed day Purohit returned with 20,000 seedlings from the G.B. Pant Institute of Himalayan Environment and Development of which he is Director, and placed them in rows outside the temple. When the pilgrims made offerings, the Head Priest stood near the gate of the temple and gave an inspiring talk highlighting religious beliefs about the spiritual importance of trees in the sacred Himalaya.

He concluded by encouraging the pilgrims to take the seedlings and plant them on the slopes as an act of religious devotion. There was a great rush, and all 20,000 seedlings were planted. Everyone benefitted: the pilgrims received blessings, the Head Priest's reputation soared, and reforestation had begun.

Thinking of the future, Purohit put up a sign asking the pilgrims for donations to care for the seedlings. In no time they had contributed a generous amount. Badrinath, like other pilgrimage sites in India, has a long line of beggars. Purohit felt that if the beggars were offered in cash what they made from begging – plus food – many of them might choose to care for trees instead of begging. To his surprise all the beggars took him up on his offer: they were as eager to get spiritual blessings as physical nourishment.

In June of 1995, Dr P.P. Dhyani, a scientist of the Institute, and the Head Priest did another planting to expand the reforested area and include species that preserve the biodiversity of the region. The next stage of the programme will be to contact priests and community leaders at the nearby shrine of Kedarnath and Tungnath, setting in motion plans to expand reforestation to other pilgrimage sites and to include additional measures such as getting pilgrims to stop littering and encouraging truck drivers to take out rubbish in return for blessings.

The successful tree planting at Badrinath shows how science and religion can work together for the benefit of the environment and the preservation of spiritual values. It is an inspiring model for sustainable restoration wherever sacred sites and pilgrimages are important.

Edwin Bernbaum

Dave Brinicombe/The Hutchison Library

For centuries, China's holy mountains were protected by Taoist and Buddhist monastries and the respect of the pilgrims who visited them. Now, in the face of growing tourist and business pressures, a new effort is being made to save them from destruction. **Martin Palmer** reports.

Saving China's holy mo

To climb some of the great and ancient sacred mountains of China is to risk life and limb. Not just because some of them, like Hua Shan in Shaanxi Province, are amongst the most dangerous in China, but because of the swirling hordes of visitors.

Sacred Mountains in China are big business and a major threat now exists to the delicate balance of ecology on many of these mountain ranges. For centuries they have attracted pilgrims. Now they are attracting tourists but, more worryingly, big business interests as well.

China has nine senior sacred mountains, five of which are associated with Taoism, the indigenous religion of China, and four with Buddhism. They range from the small mountain island of Pu To off the coast near Ningbo to the massive 200 mile long range of Heng Shan in Hunan Province. Then there are scores of lesser sacred mountains dotted across the landscape of China, each with its own aura of the holy which has helped to protect them down the millenia of Chinese civilisation.

In traditional Chinese society, sacred mountains were places of retreat from the world: places of pilgrimage, of learning, of a model of co-existence with nature. They were owned and run by the great monasteries, Taoist and Buddhist, and they offered a place of refuge to wildlife, a model of sustainable forestry and agriculture to local communities, and a vision of a more harmonious relationship with nature to pilgrims. This century, through revolution, communism, turmoil and anti-religious persecution, much of this ancient balance has been destroyed. It seems likely that the rampant growth of the entrepreneur culture may put the final nail in the coffin.

Over the last few years colleagues and I have visited most of the major sacred mountains to conduct an enquiry into the environmental and religious wellbeing of these vast sacred natural reserves. For despite the ravages of change, these places still have an aura and a local respect which means they have not been exploited to the same alarming degree as much of the rest of China. As Xiao Xiaomin, one of our Chinese colleagues puts it, "The gods still offer protection and local people respect these gods."

Today, the land no longer belongs to the monasteries and in theory the lands are open to use. Yet the old reverence has hung on and the mountains are still protected by a veil of sanctity. But this is being attacked on many fronts, not least by Chinese tourists. The religious authorities are trying to find a way of balancing these demands. "These places are meant to be hard to climb, arduous to explore," says Zhang Huane of the China Taoist Association, "for in that struggle lies humility. To build cable cars is not just to disturb the natural balance. It is to deprive us of a sense of awe."

The sacredness of many of the mountains is important to local cultures. China has scores of ethnic communities and most of these live in the mountains, because of colonisation of the lowlands by the Han Chinese. Preservation of the sacred mountains is crucial to the survival of many of these minorities. Their symbiosis with the mountain ecology has meant a balance has been established which the presence of the religious communities has enhanced. Indeed, many of the mountains were originally shamanic sacred sites belonging to the indigenous peoples, stretching back over 5000 years.

The need to preserve these mountain ranges is spelt out by Han Wudi of the state tourist authority in Shangdong Province, which includes Tai Shan, the greatest of the sacred mountains. "Once the symbol of China was the dragon and the phoenix. Now it is the crane – and I am not referring to the bird."

China is experiencing an extraordinary boom. Everywhere is a building site. Everywhere resources are being drained to make quick profits. Ironically, Chinese economic freedom may do more damage to the sacred mountains of China than the Cultural Revolution. Certainly this is the view of one of the Grand Masters of Taoism, Wu: "For centuries, Taoism has protected the sacred mountains by making them places of refuge, places where nothing was done. We have been passive. Now we must be active. We must work to preserve that which we love. We must educate people about our need for nature."

This shift from passive to active is most clearly to be seen in two linked actions. Firstly, in May this year, the Taoists of China issued a statement on ecology for the first time in their two-thousand-year history. In a clear rejection of consumerist values, they state: "Taoism has a unique sense of value in that it judges affluence by the number of different species."

'Digging out our mother's brain'

The snow capped mountains in West Papua (Irian Jaya), are part of the homeland of the 13,000-strong Amungme tribe, and are regarded as sacred. But, says Survival International, the Freeport Indonesia Company (FIC) has gouged out a huge copper mine in the home of Jo-Mun Nerek, their guiding ancestral spirit.

According to Survival International, neither FIC nor the Indonesia government respect the religious significance of the mountains of the Amungme.

"Despite FIC's claims to be bringing the alleged advantages of modern life, local people have not benefited materially from the mine. Each day 110,000 tonnes of highly toxic mine tailings are discharged into the Aykwa river with horrifying consequences. In 1980, for example, a local doctor diagnosed copper poisoning after 216 children died mysteriously."

Survival International says that compensation for the highland people has been derisory, taking no account of their land rights and long term needs. The local population says their protests have been met with severe repression from the Indonesian military and the FIC which owns some of the richest copper and gold mines anywhere in the world. Now it appears that, with $1.8 billion funding from RTZ, the world's largest mining company, FIC plans to expand its mining area and relocate 2,000 people – something which the tribal peoples are determined to prevent. As one Amungme leader put it: "Freeport is digging out our mother's brain. That is why we are resisting."

Contact: Survival International, 11- 15 Emerald Street, London, WC1 3QL, UK.

Jerry Callow/ Survival International

Right and below: Suspended temples of the Taoist sacred mountain area of Heng Shan, China, popular with pilgrims.

Left below: Yali woman, Irian Jaya.

untains

At the same time, in collaboration with WWF's programme on working with religions, the Taoists have launched a Sacred Mountains Project. WWF has long had an involvement with the world's major religions in developing environmental programmes based upon the teachings and networks of the great faiths. This year WWF joined with other interested groups to launch a new vehicle for their work with religions – the Alliance of Religions and Conservation, (ARC). ARC, in collaboration with the Taoists, the Government Bureau of Religious Affairs and the tourist authorities, is now coordinating a major survey of the ecology of the five main and three lesser Taoist mountains.

Based upon this survey, development plans will be drawn up through consultation with local people, priests, monks and nuns as well as with the relevant provincial and state government departments, which will try to ensure the survival of a balanced way of life on the sacred mountains. If this is successful – and the Government is so keen it is already proposing the next set of mountains to be surveyed – then this will be extended to the Buddhist mountains.

Walking the sacred mountains is a fascinating experience. Here great areas of natural beauty and diversity still exist. Local people retain a sense of respect and awe for the mountain and all it gives them. To walk the old pilgrimage routes is both to explore the physical and to journey into the metaphysical. This combination has produced a uniquely godly environment which has protected wildlife and peoples through the millenia. It might continue to do so for millenia to come if this project works.

High on O Mei Shan in Sichuan Province lives a Buddhist hermit. He has lived in his cave for some 50 years. Perhaps he should have the last word: "For me, the mountain is the Buddha and the Buddha is the mountain. No one wishes to harm the Buddha, so why do you harm the mountain? Come, visit, listen. But also respect all life on this mountain, for the mountain is you and you are the mountain."

Martin Palmer is Director of the International Consultancy on Religion, Education and Culture (ICOREC) and religious adviser to WWF.

Both pictures: CIRCA Photo Library

Jean-Luc & F.Ziegler/Still Pictures

Water towers of the world

John Buttank/The Hutchison Library

Top: The Tignes Dam, Savoie, France

Above: Waterfalls, Solu Khumbu, Nepal

As population grows and water becomes evermore scarce, the ecological protection of mountains becomes evermore vital. Here **Jayanta Bandyopadhyay** calls for a new awareness by the people of the plains of their debt to the mountains and their inhabitants.

Planet Earth is able to distinguish itself as the living planet because of the existence of water on its surface. But easily accessible freshwater is limited to the lakes, streams and rivers. It accounts for about 90,000 km³ or only 0.26% of the total global freshwater reserves on earth, much of which are locked up in the polar ice fields.

Even this amount cannot all be used up exclusively for satisfying human demands, because of the requirements for ecosystems conservation. Thus, the blue planet does not have an abundant stock of freshwater for humanity to keep consuming in the traditional wasteful pattern.

It is estimated that 80 per cent of the volume of freshwater on which humanity precariously depends is generated in the mountains and the uplands. It is distributed very unevenly in both space and time. And a large part of it is used up as it flows down onto the plains which are denser in population and wider in economic activities.

Not surprisingly, supply has not kept up with growing demand. Today, about one billion people in the world do not have assured supply of good quality water. Chronic water scarcity is predicted to touch the lives of some three billion people in 52 countries by 2025. If this situation is to be faced without panic or major conflicts, a very new human perspective on the management and use of water resources will be needed.

In developing this perspective, we have to be more sensitive to the processes

constituting the global hydrological cycle, which renews the freshwater stocks of the world. The mountains and uplands play an extremely important and distinctive role in the hydrological processes of the planet and in the regional hydrology of all continents.

Despite the relatively small area they cover, mountains have a direct influence on the climate conditions of a much larger area. By acting as a physical barrier to atmospheric flows, they extract large amounts of moisture creating sharp climatic divides. Water extracted on the windward side flows out as innumerable streams, rivers and lakes to meet human needs. The availability of large volumes of snowmelt has given a perennial character to many rivers, allowing significant human civilizations to flourish along their courses.

Mighty rivers like the Indus, the Tigris, the Nile and the Yangtse are only a few examples of mountain rivers which have cradled human civilizations. The Alps, the Andes, the Caucasus, the Himalaya and all the mountain chains of the world are the sources of these life-giving rivers. There is hardly an area on land that is not hydrologically linked in some way with mountains and uplands.

Without the presence of mountains, water endowment on the surface of the earth would have been very different. The Indus valley civilization would not have the privilege of surviving on the water supply from the snowmelt originating in the high-Himalaya. Nor would the Amazon, the largest river of the world, find its water supplies without the presence of the Andean mountains.

Storing water

The annual water demand of the world is reliably projected to increase from 4,130 km^3 in 1990 to 5,190 km^3 in 2000. This will certainly be accompanied by a sharp decline in the per capita availability of water in large parts of the world. The problem is expected to be most acute in parts of Asia and Africa, where water for domestic needs will compete with needs for irrigation and industry.

Regional disparity of water supply and the explosive growths of megacities will intensify the demand for large scale storage and long distance transfer of freshwater. Between 1950 and 1990 the number of cities with a population of over a million increased from 78 to 290. This trend will continue in the future decades. Indeed, the scarcity of water may soon prove to be the most important obstacle to sustainable development, and even survival, over large parts of the world.

The Three-Gorges dam on the Yangtse in China originated primarily from the need for flood control: generation of hydroelectricity got added on. The Tucurui dam in Brazilian Amazonia on the other hand, was designed directly for the generation of electricity. Supply of water to the megacities is also quickly becoming part of the menu, as in the case of the proposed Tehri high dam on Bhagirathi in the Indian Himalaya. This is supposed to supply water to the Indian capital city of Delhi some 250 km away, as well as generating electricity and providing water for irrigation.

These are only a few examples of the large-scale initiatives humanity has already started in the mountains to ensure the supply of freshwater and electricity. This potential, if manifested with wisdom and a new ethical view, could provide supplies of additional freshwater to the needy plains. If, on the other hand, the mountains continue to be seen as a free resource waiting to be exploited, then this potential is sure to disappear.

Mountains are also threatened by other extractive activities that can destabilize their role as the water towers of humanity. Mountain watersheds need to be protected from large-scale deforestation, extensive mining and unsustainable agricultural practices, while mountain streams need to be saved from large-scale diversion or toxic dumping. We have to remember what happened through the encouragement of unsustainable agriculture in the Aral Sea watershed and deforestation of the Ethiopian highlands which perpetuated water scarcity and grossly affected agriculture.

As many parts of the world come face to face with the threat of permanent water scarcity, adequate ecological protection of the mountain watersheds as well as full involvement of the mountain communities in the new initiatives for water management, have now become essential.

In order to take the wisest decisions for the sustainable use of the water of the mountains and uplands, systematic scientific data-gathering activity will be required. Due to their undulating landscape, there is a need to monitor the meteorology of the mountain areas much more intensively than in the plains. This is handicapped by their inaccessibility.

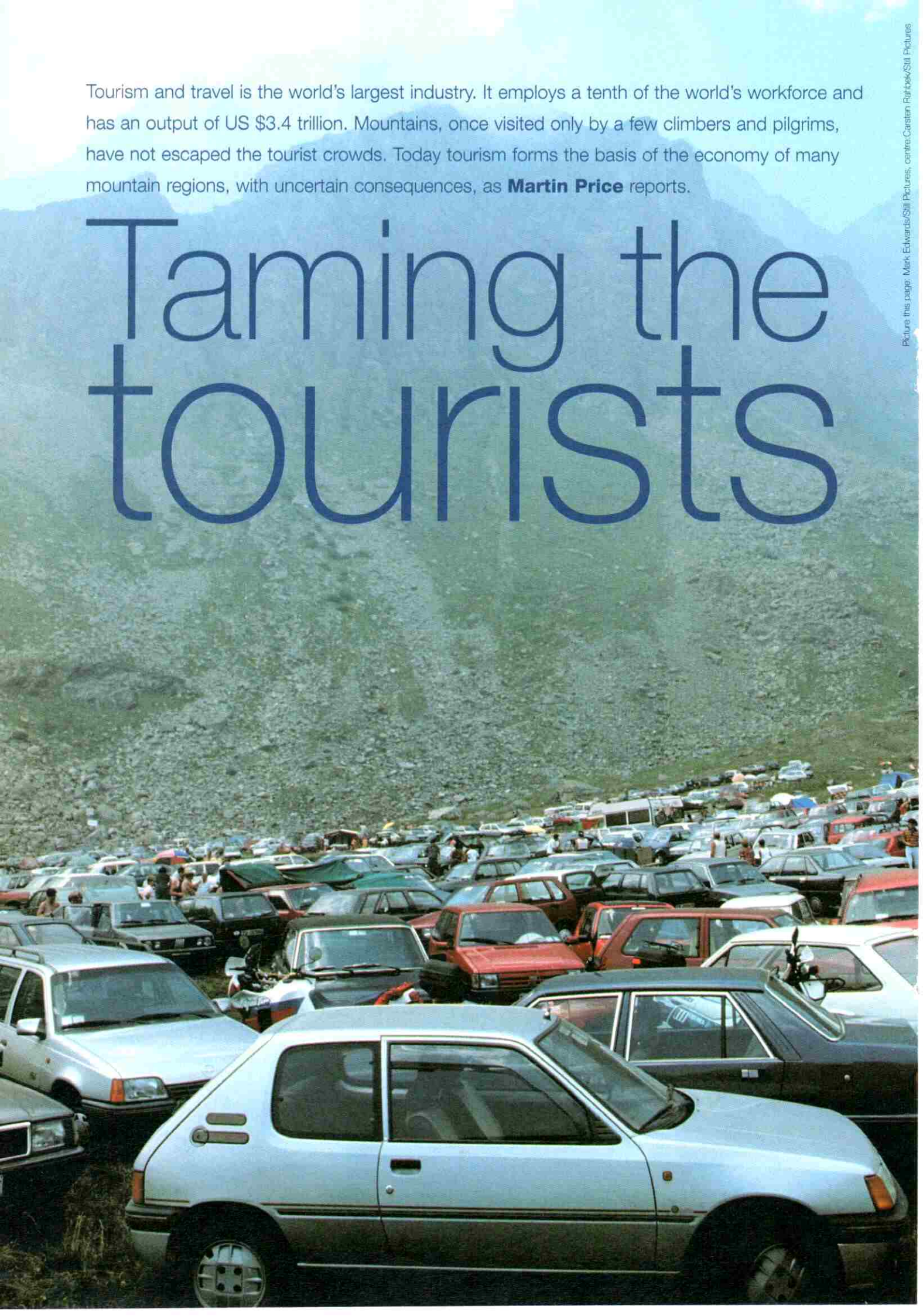
Another important element of study will be the possible impact of global climate change on the hydrology of the mountain and upland areas. Mountains are very sensitive to climate changes and should be monitored intensively. There may be significant impact on climate change on the precipitation pattern, extent of glaciers and permafrost, which may alter the water supply pattern in the plains.

Above all, there is a need to change the policy for the use of water produced by these regions. As we approach the next century, with all the increased demand and expected scarcity of freshwater that may inflame human societies, we may seek a substantial rescue from the mountains and uplands of the world. Human societies, especially those in the plains, need to sensitize themselves about their indebtedness to the planet's water towers, which can provide an endless flow of freshwater to form the basis for human survival and development.

Professor Jayanta Bandyopadhyay is Visiting Professor and Head of Publications at the International Academy of Environment, in Geneva, Switzerland. He was author of the first draft of Chapter 13 in Agenda 21 on Sustainable Mountain Development.

Tourism and travel is the world's largest industry. It employs a tenth of the world's workforce and has an output of US $3.4 trillion. Mountains, once visited only by a few climbers and pilgrims, have not escaped the tourist crowds. Today tourism forms the basis of the economy of many mountain regions, with uncertain consequences, as **Martin Price** reports.

Taming the tourists



Picture this page: Mark Edwards/Still Pictures, centre:Carsten Rahbek/Still Pictures

The era of mass tourism in the mountains of industrialized countries began soon after World War II, the result of many factors including increases in urban populations, income, vacation time, and mobility. There were new perceptions of mountain environments as places to enjoy and vast improvements in transport systems.

Today, in the era of cheap, global air travel, almost no mountain region is out of reach. Even the remote mountains of Asia are becoming easily accessible by helicopter. "Adventure tourists" and "ecotourists" are willing to pay well to visit new destinations, and their money is very welcome to poor governments and communities.

For many years, tourism has been the largest source of foreign exchange in Nepal, Bhutan, and, until recently, Rwanda. Although tourism is restricted to only a few valleys in these countries, it has become a major force in their economies. Yet mountain people rarely receive a substantial proportion of the money spent by the tourists: most stays in countries where the tourists originated.

Tourism can help to stem depopulation and increase incomes by bringing new sources of revenue, but it also tends to destabilize societies and environments. This is especially true when the main tourist season is also the prime agricultural or herding season. Tourism places great demands on local people and their environments, for labour, food, water, and fuel. If Nepalese farmers can earn more in a few weeks as porters than they can in a year from their fields, it not surprising that many leave most of the farming to their wives.

In parts of Nepal, this has led to a decline in farm output and a change in the local diet, because there is insufficient labour to maintain terraces and irrigation systems and tend to crops. The result is that many people have turned to outside supplies of rice and other foods. Yet, as in Ladakh, the story can be the other way round: the arrival of the road and the tourists led to vegetable growing and the diversification of local diets.

Some of the physical impacts of tourism are well-known. Much attention has focused on erosion in ski areas and along trails, but perhaps more important are deforestation and impacts on vital water supplies. In the Alps and Rocky Mountains, water is scarce in winter, and possibilities for treating wastewater and sewage are often the factor most limiting the development of ski areas.

Along the valleys of Himalayan rivers, where large numbers of people move from camp to camp, health problems often emerge from inadequate sanitary facilities. Hot showers, advertised as an attraction for tourists, use much water and fuel. This is usually wood, which is also the main fuel for cooking, typically on inefficient stoves or fireplaces. This further contributes to pressure on slow-growing mountain trees and, often, to deforestation along the narrow tourist corridors.

Yet mountains are also prime sites for small renewable energy projects based on water, sun, or wind. Small investments can have large payoffs by providing reliable energy and decreasing deforestation, as shown by the introduction of micro-hydroelectricity and efficient stoves and water heaters in Nepal's Annapurna Conservation Area. Very importantly, these technologies have been partially funded by local people, are produced in Nepal, and can be easily repaired and maintained by local people.

Although stories about the "problems" of tourism have become ever more frequent in recent years, tourism is not necessarily a problem. A more positive approach is to accept that it is probably inevitable, and to consider how best to integrate it into the existing culture, with minimal impact on the environment and without becoming too dependent on it. Indeed, it may even help in reinvigorating local cultures, as with the Sherpas of Nepal's Khumbu Valley and in some Alpine villages. And a growing number of adventure tourism operators are trying to ensure that their activities benefit the local population and the environment over the longer term.

In the Alps, communities are increasingly realising that their future depends on integrating tourism in a diverse economy. In the Swiss Pays d'Enhaut, local concern about second home developments led to limits being imposed on their growth. At the same time, a renaissance of communal cheese production began. This has been so successful that the proportion of people in agriculture has increased; and the cheese makers are among the few in Switzerland who are not subsidized by the federal government.

Integrated, community-based approaches have also been developed in the mountains of developing countries. The Monteverde cloud forest is now one of Costa Rica's main ecotourism destinations, accounting for nearly a fifth of the country's tourism revenues. While Monteverde is visited by 50,000 people a year, ten times the local population, both they and the ecosystems of the cloud forest reap many benefits. Many businesses are locally-owned, and local people are employed as naturalist guides. This helps not only the local economy, but also minimizes the impact of tourists on the cloud forest, much of which is protected as public and private reserves.

A similar approach has been taken in Nepal's Annapurna Conservation Area, visited by 80,000 people a year. Over 700 tea shops and lodges have been built. Today, the local people are learning to maintain a high level of control over their resources and their future by building an endowment fund from entry fees to the area and working together on education, community development, biodiversity, and energy conservation projects.

One of the greatest concerns of mountain people is that they will lose control over their culture, their economy, and their environment as tourism develops. Merely restricting tourism cannot be the solution to this imbalance, because people's desire to see new places will not just disappear. Instead, mountain communities must achieve greater control over the rate at which tourism grows and the paths it takes, integrating it with other activities based on traditional culture and natural resources. Ever more communities are demonstrating that, with firm communal decision-making, this is possible.

Martin Price directs the Mountain Regions Programme at Oxford University's Environmental Change Unit and is editor of *People and Tourism in Fragile Environments* to be published by John Wiley in 1996. He acts as the focal point for mountains activities, IUCN Europe.

Nigel Dickinson/Still Pictures

Above: The Swiss village of Saas-Fee is operating exclusively with electric vehicles.

Centre: Ecotourists at a cloud forest in Loja, Ecuador.

Left: A peat bog near the source of the River Po, Italy, is used as a tourist car park, destroying rare alpine flora and fauna.

Bringing the Inca canals back to life

For nearly 20 years one woman has been battling to restore the elaborate Inca Canals in the Peruvian Andes, which once supported a thriving population of farmers. **Sally Bowen** reports from Lima

All over the Peruvian Andes, beautifully-engineered Inca-built irrigation canals once distributed water to elaborate terrace systems. In turn, the terraces – oases of cultivation on the precipitous and other wise barren mountain slopes – provided food for hundreds of thousands

Today, around the ancient Inca capital of Cuzco, most of these once-impressive structures lie abandoned. Over the centuries, canals have crumbled and fallen into disrepair. As a result, the Andes can support only a fraction of the population it fed 600 years ago, encouraging migration to already-overcrowded cities.

Since 1977, however, the extraordinary initiative of one woman has rekindled interest in rehabilitating the ancient terraces. In August, Ann Kendall presided over the inauguration of her second fully-reconstructed canal. It will provide constant irrigation for some 160 hectares of agricultural terracing and be a prime source of sustenance and income for nearly 350 families, over 2,000 people.

Dr Kendall's Cusichaca Trust project is active in Ollantaytambo, 50 miles from Cuzco. With financing from Britain's Overseas Development Administration (ODA), water last year started flowing to terraces fed by the first stage of the rebuilt, four-mile Pumamarca canal. Already, dozens of families have benefited from bumper crops of potatoes in an unusually dry season: without irrigation, the harvest would have been a disaster.

It will be another few months before the splendid, so-called Choquebamba terraces, almost immediately above Ollantaytambo town and watered by the same canal, are in full operation. "They are large and complex, each with a slightly differed gradient and distinct water distribution points," explains Dr Kendall. "To get the water flowing properly, you have to rebuild the traditional way."

Well-constructed terracing creates an almost perfect biomass system. The Incas piled large stones on a clay soil base, with gravel above and finished off with a metre or so of good topsoil (brought in on the backs of labourers, often from many miles away.) Water percolates slowly through each terrace to the one below, the clay allowing for some moisture retention.

"In the damp environment, organic matter gradually breaks down and is recycled upward," Dr Kendall says. "No fertilisers are required – in fact both they, and pesticides, could destroy the natural biomass system. This is genuine organic agriculture."

Ann Kendall first visited Peru as a graduate student in 1968, pursuing research for her MA thesis on Inca architecture. Later, her doctorate brought her back for further investigation into rural Inca planning.

While it was archaeology that first lured Ann Kendall to Peru, a gradually increasing interest in rural development made the link a lasting one. Since 1974, she has spent every summer in Peru bar two (one of those absences due to the birth of her son).

"Rural development is extremely rewarding," she says. "It's the most fertile area I've found for investigation and for understanding Andean life: a sort of projection backwards into time."

In the work of the Cusichaca Trust, archeology and development have proved mutually enriching. Dr Kendall's original research on the structure of Inca canals allowed locals to restore the Pumamarca waterway as it originally was, using traditional technology. That meant choosing locally available materials – clay, sand, stones and cactus – instead of the cement favoured by some development projects working in the same field.

"Traditional technology is greatly preferable when you are dealing with valleys such as these, in

All photographs/The Cusichaca Trust

Below: Community members restore the ancient Inca terraces of Choquebamba.

Right: Upper Pumamarca irrigation canal restored. Nearly 6 km long, it took four years to rebuild.

areas where earth tremors are common," she explains. "Clay is a far better sealant than cement and it remains damp and plastic. In an earthquake, cement cracks and falls apart, making for greater destruction. It works against the environment."

Initially, it was hard to convince the labourers of Ollantaytambo who worked on the canal reconstruction of the bounties of 'traditional' clay over 'modern' cement. Now, they are enthusiastic converts to the old ways. "We've rediscovered the techniques of our ancestors," says the aptly-named David Canal, a native of Ollantaytambo who now oversees the canal project. "There are many technologies worth saving and preserving. Naturally, we're not rejecting modern advances but, when the old methods are more appropriate, we should use them."

For Ann Kendall, archaeological studies continue to throw light on today's environmental problems. This season, her team of young archaeologists, many of them undergraduates from British universities, have been studying a site north-east of Ollantaytambo towards the jungle. Here, there is evidence of 4,000 years of continuous cultivation. Yet over-exploitation of agriculture, Dr Kendall says, "knocked the area out entirely for about a thousand years." Slash-and-burn farming, of the sort that is being practised again today, caused desertification. Pollen studies prove the soil took centuries to recover.

"What this shows is the similarity of the problems then and now," she says. "Archaeological research can teach valuable lessons for the future, indicating how best we can develop and how to avoid repeating the mistakes of the past." Respectful of the past, Ann Kendall avoids romanticizing it. "People didn't necessarily know better 2,000 years ago," she says. "They had fewer options and they made mistakes. We need to learn from them to progress."

Alongside canal restoration and research, the Cusichaca Trust has developed a series of highly practical rural initiatives. In the isolated high Andean communities around Ollantaytambo which cannot benefit from the canals, Ann Kendall's small team of Peruvian nationals has introduced Andean greenhouses and market gardens. Breaking with strict tradition, plastic sheeting is added to adobe-mud buildings. Inside, locals are able to grow unfamiliar vegetables. The experience of walking into a high-altitude greenhouse, with its interior jungle climate, to find red peppers and tomatoes, spinach and radishes flourishing, is breathtaking.

Not surprisingly, villagers from other communities frequently arrive in Ollantaytambo seeking help and advice: they too want canals rebuilt or greenhouse technology installed. Through a system of workshops, the Cusichaca Trust has trained representatives from several nearby villages. "We're proud of what we've done and we're here ready to help others," says David Canal.

In the case of the Ollantaytambo community, the land will be able to absorb new families and those returning from urban areas. However, the experience of the Chamana community near Cusichaca shows that actual family size has not increased with the improvements in life expectancy. Instead, it has tended to stabilize since the economic benefits have put people in touch with the world outside the valley and the health and family planning services available there.

"We don't want to have to share our hard won gains with too many mouths," said Victor Pacheco and his wife, who now farm on the rehabilitated terraces at Cusichaca.

A new cultural centre is being installed for the community and its visitors in Ollantaytambo, with principal funding from the European Union and Copesco, the Peru-UNESCO agency. It will soon offer yet another way of handing down the lessons of the past to present and future generations. In a charming old Inca and colonial building close to the famous ruins, Briton Chris Hudson is designing the layout for a series of displays focusing on the history of the region, its ethnography and environment. Its training role has already taken off, with a pottery workshop and three day seminar on traditional technology.

"The idea is to show what the past has taught us about caring for our environment," says Dr Kendall. "What we don't want is to teach dependence."

With the canal project effectively finished and its management in the capable hands of trained locals, Ann Kendall now plans to spend more time writing of her Peruvian experiences and encouraging neighbouring Andean communities to rehabilitate their own ancient agricultural infrastructure.

Sally Bowen is Financial Times correspondent in Peru.

Donations gratefully received by: Cusichaca Trust, Springfields, 62 High Street, Belbroughton, nr Stourbridge DY9 9SU, UK.

Protecting the 'h

To the Kogi Indians of the Sierra Nevada de Santa Marta, in Colombia, the Sierra is 'the heart of the world'. One man is at the centre of effort to restore that heart to good health.

Sarita Kendall reports from Bogotá.

The Kogi Indians believe the Sierra moves between good and evil, between day and night, between south and north, searching for an equilibrium, says Juan Mayr, founder and director of the Fundación Pro-Sierra Nevada de Santa Marta. Since he first went to the Sierra as a photographer 20 years ago, Mayr himself has been a key figure in this search. Most recently he started the process of bringing together conflicting interest groups in order to forge a long term conservation strategy for the region.

The Sierra Nevada de Santa Marta is an isolated mountain range, rising abruptly from the Caribbean coast of Colombia to snow-covered peaks over 5,500 metres high. The Kogi Indians, who have retreated further and further up the mountains as new settlers take over the fertile lower slopes, say the Sierra is the heart of the world. Kogi 'mamas' or priests must look after its physical and spiritual health to guarantee the harmony of the universe. Streams, rocks and mountains, as well as burial grounds, are holy places that should be respected but only too often have been desecrated by peasant farmers and grave diggers.

The Sierra is a Biosphere Reserve with an extraordinary variety of climates and ecosystems, ranging from the wet northern facing slopes where ferns, lianas and epiphytes drape the trees to the semi-arid cactus-covered eastern foothills. Numerous reptile, plant and bird species are endemic to the Sierra and, despite the fact that only 15 per cent of the original forests remain, tapirs, pumas, spectacle bears and otters are still to be found.

In pre-Colombian times the Sierra supported a large indigenous population which practised vertical ecology, growing different crops at different altitudes and taking salt and fish from the sea. The ruins of dozens of settlements with well-built stone terraces and paths that also served as drainage channels dot the steep ridges. By the early seventeenth century the Spaniards had won control of the lower Sierra and ransacked graves to steal goldwork and pottery. Later, the exploitation of valuable woods began and peasants using ill-adapted farming systems invaded Indian lands. The population has now grown to about 220,000, of which some 20,000 are Indians.

During the late 1970s and early 1980s Juan Mayr lived in the Sierra, exploring pre-Colombian sites and "trying to understand the Indian communities and their relationship to the land." He published a book of photographs and articles which was launched by the then President of Colombia, Belisario Betancur, and soon after the Foundation was born.

"The Sierra is a microcosm of Colombia, with all the country's problems represented. At the top are the Kogis, an exceptional pre-hispanic

Beatriz Saravia

state, one of the great legacies of South America. Then further down are the peasant migrant families, many of whom fled from Andean areas to escape the Violencia of the 1950s. The bottom of the Sierra is run by Costeños (coastal people) who own big haciendas."

In addition to these main groupings, says Mayr, there are guerrillas – they control over two-thirds of Sierra territory – paramilitary, coca, marijuana and poppy growers, Arsario Indians with only remnants of their own culture and 1.5 million lowland dwellers who depend on the Sierra for their water supply. First of all the Foundation made a detailed diagnosis of the physical, historical, cultural and social situation, published in atlas form.

"With so many conflicts it's difficult to find any basis for joint action. We decided to focus on water as the main axis – everyone is interested in water, even though they have differing points of view."

The glaciers retreat a little further every year and the Kogi mamas worry

eart of the world'

about the deterioration of the high paramo, which acts as a giant water-holding sponge. More than 30 rivers and countless streams plunge down the Sierra valleys but, whereas the water flow was once regulated by forest cover and Indian technology, now the bare, eroded slopes result in alternate flooding and drought.

"The 1991 Constitution talks about participation but the concept isn't easy for traditional groups to understand. We spent a long time wondering how to get the conservation strategy going and when we started the process we invited absolutely everyone to join in. We used the water problem to create an opening for discussion."

However, says Mayr, there was little point encouraging participation unless people understood the issues and options being decided on by local government bureaucrats in distant offices. In co-ordination with other entities, the Foundation began to organize work shops and meetings with all the different interest groups, using theatre and other methods to explain land and water conflicts. "The concepts of sustainable development and conservation imply a vision of the future. But in the Sierra there were people who said, how can we think about the future if we're being killed today? This led us into human rights and we incorporated training on basic rights.

"The Indians have always seen the White as a threat and the peasants look on the Indian as some sort of wild animal. Then, at one meeting, there was a change. Peasant leaders recognized that they had invaded land and violated Indian graves – they admitted it was their fault, that they didn't realize how important the graves were for the Indians."

The conservation strategy has to be adapted constantly to changes at the local and national levels: it is a flexible process rather than a rigid plan. One of the aims is to ensure that all the institutions covering the Sierra – there are two national parks, two Indian reserves, three departments and eleven municipalities – co-ordinate activities and include environmental variables in the development plans. The fact that the municipalities have formed an association and the creation of the Regional Corporation for the sustainable development of the Sierra Nevada by the Ministry of the Environment should help this.

Although the Foundation – backed primarily by the German aid agency (GTZ) and the World Conservation Union (IUCN) – has been concentrating principally on the conservation strategy, other complementary projects continue. "We seem to be involved in everything from research on biodiversity to Indian culture to economic analysis," says Mayr. The Foundation has its own field stations and works with other organizations on health, environmental education, farming systems and conservation actions.

Not everyone is sympathetic to Mayr's energetic leadership or the Foundation's work – one field base was taken over by guerrillas while some of the most acculturated Indians have refused to participate in the strategy. Mayr says the structure of the Foundation is changing and internal decisions are more democratic now. He also believes that the role of NGOs as intermediaries between local communities and government insititutions needs examining.

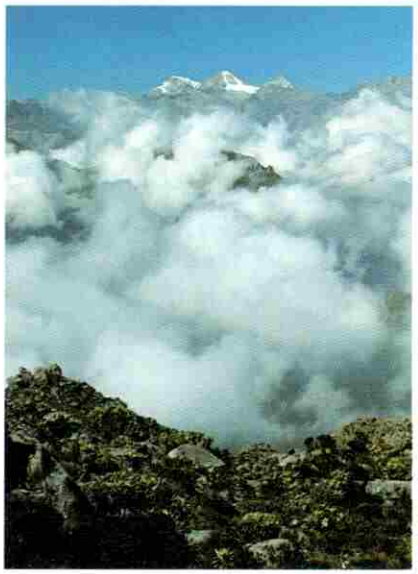
In 1993 Juan Mayr was awarded the Goldman Conservation prize for his work in the Sierra and he is currently vice-president of the IUCN. Although this takes up a lot of precious time, travelling to and from meetings, he thinks it is important for the South to be represented in the environmental debate. "The discussion is still centred in the northern countries, with documents and more documents. But we are facing environmental problems and community conflicts that need concrete action."

Like most NGOs, the Foundation fights a constant battle for funding and foreign donors often have fixed ideas about what constitutes progress. "With something like the conservation strategy, few results are immediately measurable – the effects of what we're doing will be seen in 10 or 20 years. We want people in the Sierra to be able to define their own needs and priorities and often these things don't figure in the donors' schemes. I think we've been successful precisely because we've focused on one specific region, we understand its dynamics and know the people."

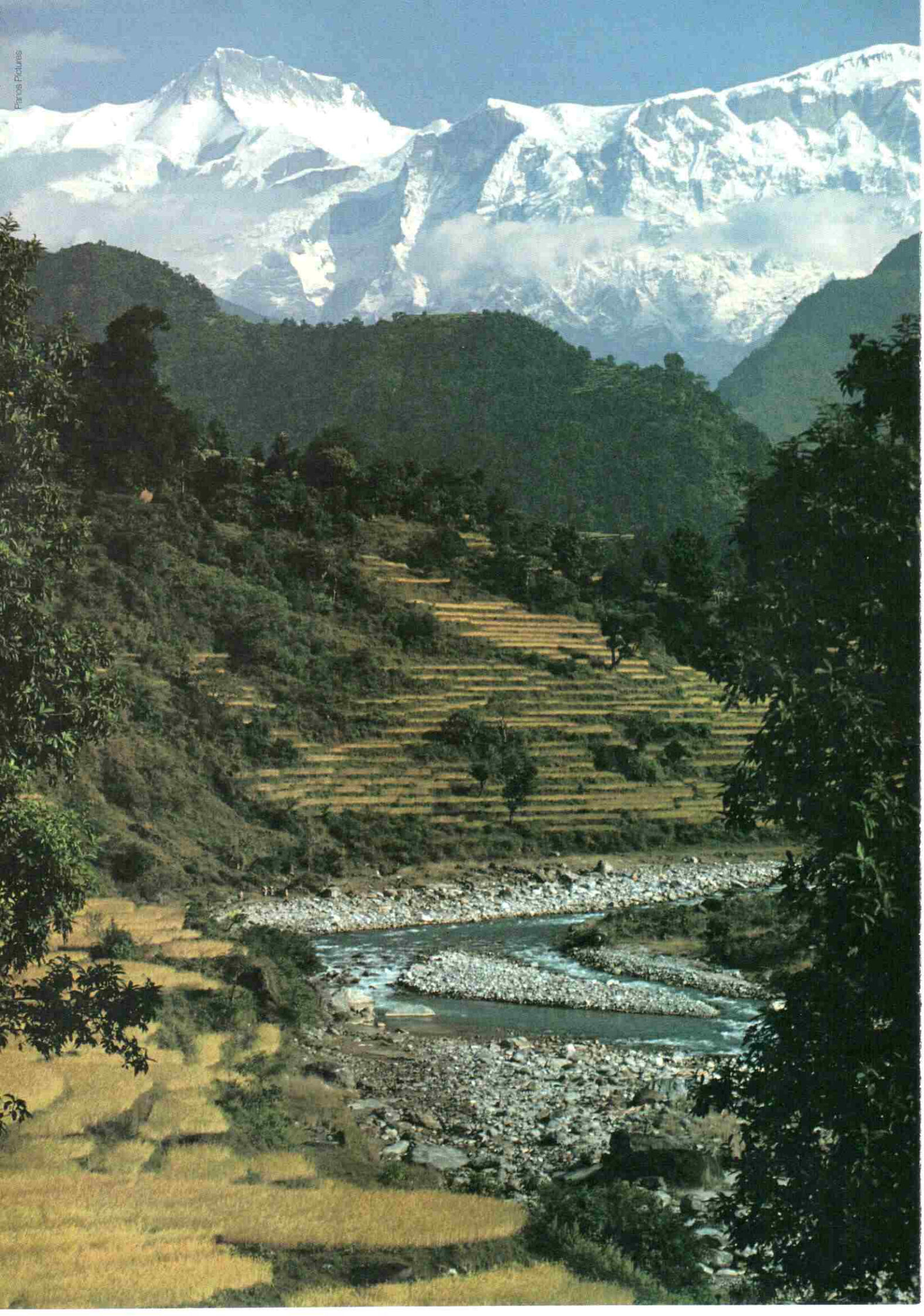
Sarita Kendall is *People & the Planet* Correspondent in South America.

Left: Juan Mayr in discussion with a Kogi 'mama'.

Below: The Sierra Nevada de Santa Marta mountain range, Colombia.

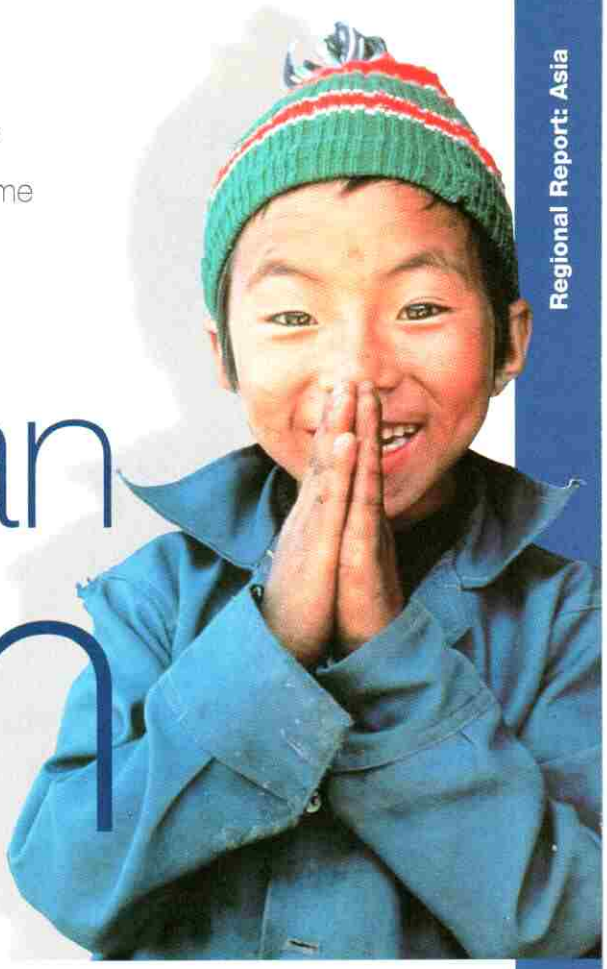


Juan Mayr


Parvis Pictures

The idea of creating a park as big as Switzerland in the heart of the Himalayas – spanning the border between Nepal and Tibet – became reality in 1992. Here **Jane Pratt** explains how a conservation dream is being turned into reality.

A Himalayan dream



"Namaste" greeting from Makalu-Barun boy.

Lamu Sherpa arrived in the tiny village of Seduwa, east of Mount Everest tired but happy after walking two days from the District Centre of Khandbari – itself three days walk from the nearest road at Hile. Lamu is a community development officer of the Makalu-Barun National Park and Conservation Area (MBNPCA) project in Nepal, and walking and talking with villagers is a big part of her job. Today, she has come to assess progress with the women's allo weaving cooperative – one of many groups established to generate income for villagers living within the conservation area.

The beautiful and exotic allo cloth – something like raw silk – is woven through a laborious and difficult process from wool and the fibre of the giant stinging nettle (*Girardinia diversifolia*), the longest-staple fibre known in nature. Known for centuries to Scottish highlanders, native Americans, and other traditionally self-reliant people, allo weaving has died out wherever less labour intensive alternatives are available.

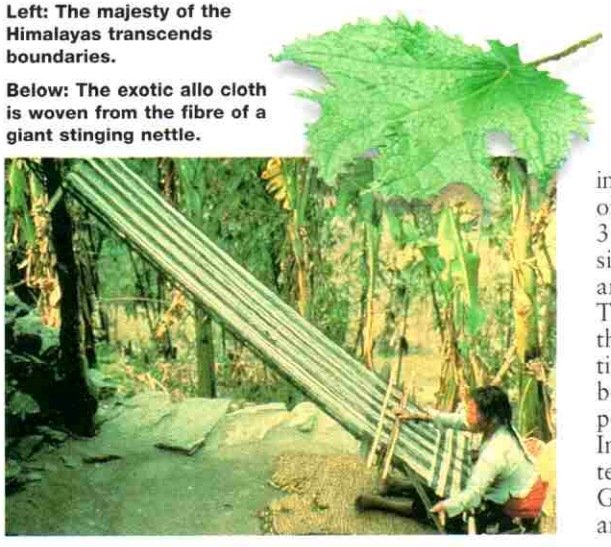
The indigenous ethnic groups in this remote region are among Nepal's poorest, making them among the poorest anywhere in the world. Allo cloth used to be one mark of that poverty, since no one who could afford to buy fabric would dream of taking all the time and trouble needed to make cloth from stinging nettles. Now allo cloth weaving, and its export to national and international markets, is part of a vast community-based conservation programme that integrates conservation, community development and promotion of indigenous culture.

How the women of Seduwa came to have a different dream is part of the story of a larger vision – that of conserving the rich natural and cultural heritage of the world's mountains.

Makalu-Barun National Park and Conservation Area, covering some 2330 km^2, was inaugurated in Nepal in 1992. Together with the adjoining Qomolangma Nature Preserve (QNP) in Tibet Autonomous Region of China, it covers nearly 38,000 km^2 – roughly the size of Switzerland – around Mount Everest. The entire area is one of the largest under protection in the world, and has been designed and supported by The Mountain Institute in a unique long-term partnership with the Government of Nepal and the Tibet Autonomous Region of China. The area under active conservation is further augmented by the adjacent Sagarmatha and Langtang National Parks of Nepal's Department of National Parks and Wildlife Conservation.

Left: The majesty of the Himalayas transcends boundaries.

Below: The exotic allo cloth is woven from the fibre of a giant stinging nettle.



The Mountain Institute

Nestled beneath the towering Himalayas, and sacred to nearly one billion Hindus, Tibetan Buddhists, and practitioners of indigenous religions, the transboundary protected areas include five of the world's highest mountain peaks: Everest (Sagarmatha in Nepali, Qomolangma in Tibetan), Lhotse, Makalu, Cho Oyu, and Shisha Pangma. Pristine valleys radiating from these peaks extend from 8,000 metre summits down to the high, dry Tibetan plateau to the north, and to the tropical, moist life zones at less than 500 metres above sea level in Nepal to the south. In between, at 1,097 metres, the mountains shelter the confluence with Nepal's Barun and Arun River valleys, proposed site of the recently disputed dam.

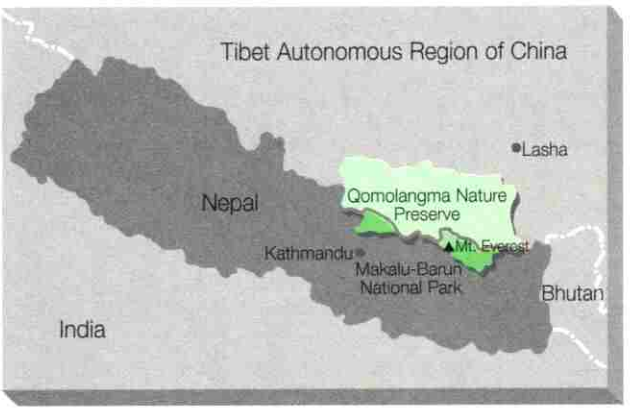
Recognized by leading biologists as the "last pure ecological seed" of the eastern Himalaya, the region has been designated by UNESCO as one of the ten most threatened biological treasures on Earth. The area is refuge for threatened and endangered animals, including the rare and endangered snow leopard and clouded leopard, as well as musk deer, red panda, and the Himalayan black bear. According to Professor Li Bosheng of the Chinese Academy of Sciences, a pre-eminent botanical authority on the area, "Two

major biogeographical zones – the Tibetan plateau and the Himalayan highland – meet here to create an exceptional variety of habitats supporting a biodiversity of global importance." That biodiversity, according to a recent survey, includes over 80 species of wildlife and more than 3,000 plant species.

The transboundary area is one of the few in the world where indigenous cultures remain intact, and where cultural value is recognized as being on a par with biological value. Pilgrims still visit the sacred caves where Milacepa – the founder of Tibetan Buddhism – found enlightenment. According to Wagchuck Namgyal, former Director of the Tibet Development Fund, "The traditions of local people are indeed a treasure as precious as any natural or historical riches."

The protected areas are now cited as promising models in community-based conservation, and efforts are now underway to adapt the model to other regions, such as the Huascaran National Park in Peru. The initial challenges were daunting. The Makalu-Barun area was under threat due to increasing and poorly understood pressures. The familiar problems of human settlement were on the increase – including over-harvesting of forests, over-grazing, and use of slash and burn agriculture by many of the region's poor and hungry people.

While human settlements were sparse in the past, growing populations, and increasing tourism threatened greater environmental degradation unless careful planning and management was introduced. In addition, the area has significant hydropower development potential, forming the watershed for the Arun River. On the northern side of the range in the Tibetan plateau, the human threats to environment and culture were equally serious, and the opening of the area to tourism in recent years has dramatically increased pressure. Governments on both sides recognized the problems early, and had many reasons to want to address them.



In response to the urgent and complex problems, unique partnerships were developed among local people, governments, and international and national NGOs. Separate Memorandums of Understanding were drawn up among the various partners, based on their own strengths and capabilities.

The Mountain Institute, based in the Appalachian range of West Virginia, helped this process along. An international NGO committed to preserving mountain environments and advancing mountain cultures, the Institute believes that healthy mountain ecosystems, communities and cultures are inseparable. Their sustainability can only be achieved if mountain people are given the opportunities to plan and work towards this goal.

Working from these basic principles, the Mountain Institute formed long-term partnerships with the governments and people both in the Makalu-Barun National Park and Qomolangma Nature Preserve. The donors, in turn, agreed to take shared responsibility for the success of the projects.

The partnership views its responsibility as that of empowering and facilitating the real responsibility for management that rests with the local people, and with the scientists who speak on behalf of nature.

Project components include park management, community development, tourism development, and applied scientific research.

The design phases are complete, and field work has begun. In Makalu-Barun alone, the project has helped turn over more than 2,000 ha of forest to management by local user groups, over 3,000 villagers have been supported in obtaining scarce water resources, and the project has worked with 12 communities to construct or restore local cultural and religious sites.

A very significant impact has been among the 100 women allo producers with whom Lamu Sherpa works. In the three years Makalu-Barun has worked with these women to increase weaving skills and expand marketing, their revenues and wages have nearly doubled. The initial producers' club has spun off three new sub- clubs that are involving more women in the production of this valuable cloth. Traditional users of forest resources, especially women, have developed their own plans for managing their forest resources. In this they were helped by Makalu-Barun project rangers. Half of them are women – a major achievement in a region where no women had ever held such positions.

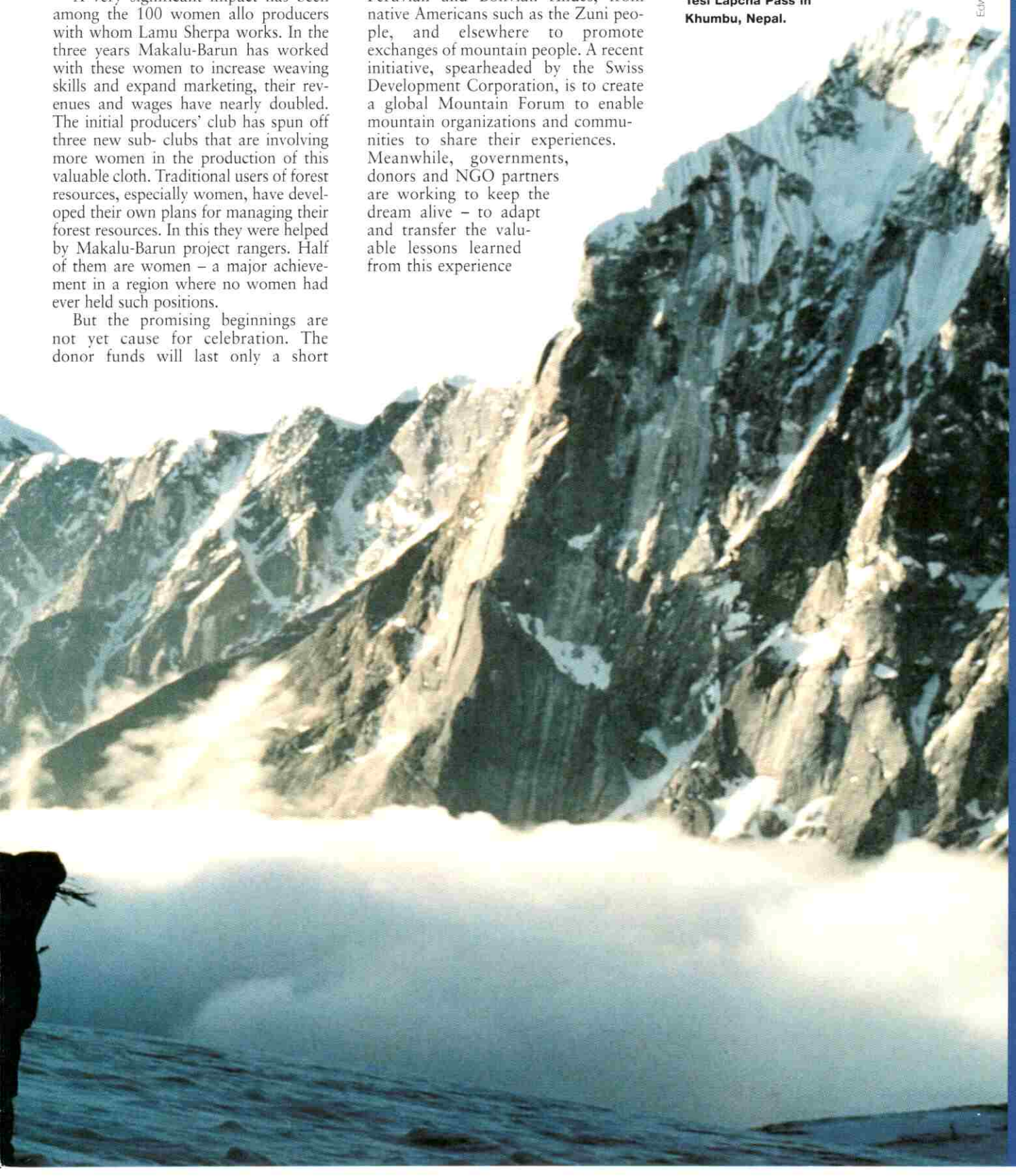
But the promising beginnings are not yet cause for celebration. The donor funds will last only a short while, and the partners are working hard to try to establish a long-term endowment. The government and local communities are committed to making their vision a reality, and will continue to contribute local resources. But these funds will need to be supplemented from many sources, including tourist fees, to keep these innovative conservation efforts moving forward.

Looking ahead, the partnership established to protect the transboundary regions of Nepal and Tibet wants to respond to new requests from the Peruvian and Bolivian Andes, from native Americans such as the Zuni people, and elsewhere to promote exchanges of mountain people. A recent initiative, spearheaded by the Swiss Development Corporation, is to create a global Mountain Forum to enable mountain organizations and communities to share their experiences. Meanwhile, governments, donors and NGO partners are working to keep the dream alive – to adapt and transfer the valuable lessons learned from this experience to conserve our planet's precious mountain environments, and mountain peoples' cultural heritage.

Jane Pratt is President and Chief Executive of The Mountain Institute. The Institute is working with partners to design and implement large-scale community-based conservation in the world's oldest, highest, and longest mountain ranges: the Appalachians, the Himalaya, and the Andes.

Below: Trekking through the Tesi Lapcha Pass in Khumbu, Nepal.

Edwin Bernbaum



Save the Hi

Sujaya Misra travelled to the Central Himalayas to meet veteran campaigner, Sunderlal Bahaguna.

In the middle of the last century an English adventurer named Wilson arrived in the Garwhal hills very near the source of the Ganga, India's holiest river. He killed and stuffed rare birds and exported them. Etiquette demanded he pay obeisance the Raja of Tehri, so he went and took with him 400 gold coins.

The Raja was astonished and delighted to see so much gold, for his own wealth was really in the form of food and grains, and asked Wilson the source of this bounty. When the latter explained, the Raja called Wilson his golden bird. "Oh, there's much more money to be got," said Wilson. "Allow me to cut the trees of the Himalayas and the timber can make us a fortune."

The Raja agreed, and he and Wilson soon became rich, exploiting the Ganga's current to send down timber to the plains. Wilson married a local girl and himself took on the honorific of Raja. The real Raja too, was pleased and everyone lived happily ever after.

But not quite. Sadly, this is no fairy tale but a true story, and 'Raja' Wilson is known today as one of the first people to start the process of deforestation and environmental degradation in the mountains of North India. Not just Garwhal, but most of the Himalayas today is under threat. While a century ago the excuse could be said to be greed without knowledge of the consequences, now, however, the greed is compounded by indifference, or worse.

Spearheading the "Save the Himalayas" movement is Sunderlal Bahaguna, an activist and campaigner all his life. Bahaguna firmly believes that change and development must take into consideration the people it will affect. His famous 'Chipko' (literally 'stick to') movement drew a spontaneous following; when trees were to be felled the people refused to allow it and hugged the trees. Women were the most adamant. Their protest was successful and the trees were left alone.

Currently, Bahaguna is fighting to prevent the building of the Tehri Dam. A Gandhian, he believes firmly in non-violence. His form of protest was a fast which lasted for 49 days at which point the Prime Minister of India agreed to discuss the issue. Sadly, it is not resolved, with the government now trying to renege on its promise (see box).

Sunderlal Bahaguna is not against development, but for development that is sustainable. He has first hand knowledge of the Himalayas, and has walked from one end to the other: his "Great Himalayan March" covered thousands of kilometres. "The Himalayas are bleeding on account of aggressive development," he says and lists four activities which are very harmful. "The first is the building of large dams. This is killing rivers, changing the ecology and displacing people."

The second is mining, "which is skinning the mountains." He cites the example of the hillsides around Dehra Doon where extensive limestone mining went on for years. "What was the home of the basmati rice was turned into desert."

The third problem is deforestation. "Today only the bones of the hills remain," he says, "the flesh and blood has gone. A century ago the hills exported over thirty things, such as fruits, herbs and honey. They had a surplus and could barter. Now we have soil erosion and people are compelled to keep moving."

Bahaguna lists luxury tourism as the fourth problem of the Himalayas. "For our government the dollar is god and they will do anything for it. For centuries the people lived lives of austerity and took very little. There is a vast difference in the mentality of a tourist and a pilgrim. Even the rich when on a pilgrimage live like fakirs. Earlier the visitors were pilgrims and they did not stay. They bought 'sattu' (a porridge) which they just mixed with water. Now they need tea and fast food; at Gomukh, the 'cow's mouth' – a cave in the glacier which is the source of the Ganga and a famous pilgrimage spot – there are seven tea shops burning 200 litres of kerosene a

Tehri: a dam too far?

The Tehri Dam is being built on the edge of the Central Himalayan Seismic Gap, 45 km from the epicentre of the 1991 earthquake.The dam is being strenuously opposed by scientists and environmentalists on several grounds. The first is the seismic danger. Should an earthquake occur, the dam's 700 billion gallons of water would crash down river, submerging the holy cities of Rishikesh and Haridwar within an hour.

Another concern is the relocation of the people to be displaced by the dam. Then there is the problem of siltation. "When you think that the dam will stop functioning after about 30 years because of siltation, where is the justification for spending so much?"

Though armed with detailed information against the dam, the response they have received from the government has been indifferent at best. The government remains unconvinced that the dam should not be built.

There are many reasons for the government to want to go ahead with the dam. An understandable one is that the country needs power. A less understandable reason seems to be the amount of money such a project generates.

The agitation against the dam continues. Sunderlal Bahaguna first protested with a 45-day fast in 1992; he broke his fast on the assurance of the Prime Minister that the project would be reviewed. Yet work on the dam started again in autumn 1994. In the spring of 1995, when Bahaguna and his supporters tried to stop the work, they were arrested and taken to the plains. Bahaguna went on an indefinite fast demanding there be a comprehensive review of the dam by independent experts, the Prime Minister agreed a review.

It would seem, though that the government is stalling again, as nothing has happened since. Says Bahaguna: "When there is such a difference in opinion, does it not make sense to review it. After all we are talking about the ecology of a whole region."

Sujaya Misra

Raghu Rai/Magnum

malayas

day. Earlier the glacier was near Gangotri, but now it is 19 kms away. It has receded 800 metres in just four years.

Bahaguna feels that any exploitation of the rivers should be to serve the people in the area. "The hill people hardly have 10 litres of water per day per head." says Bahaguna. "On the plains the well off use 246 litres. When I said this to a minister, she replied, 'We have lawns which need watering.' This is legalized robbery. Water is a national resource. What is dividing us is that we are asking that water should be taken to the people, whilst they want the opposite. The district centre for the Tehri, instead of being in Tehri, will end up in Meerut on the plains, hundreds of miles away. I see no justice in taking the water to grow sugar cane, or to fill swimming pools."

Spending money on big dams is another blunder, he says. "If the planners have their way, the Ganga as you see it in the hills today will disappear either by being dammed or in tunnels. Only when a party is not in power does it oppose dams. Otherwise the lure of the almighty dollar makes them feel that dams will provide cheap industry. The other justification is irrigation. But once again this is not being thought through. There are already problems of water logging and salinity."

"Our first priority is to make small schemes. Small hydel schemes will not kill the rivers; and we can have them everywhere. The river is not just water but aqualife. These small schemes will generate all the electricity we need."

"Electricity," he says, "is a MUST for the hills. There would be no need for firewood if there were cheap electricity. The women work like animals with their backpacks of wood. Even the old technology was better, as the water mills helped grind flour.

"The first use for electricity should be to lift water to the hill tops so that they can be made green again. All greening exercises will fail as long as there is no moisture – even a small amount will do. We have a slogan which translates as 'Take water on top; plant trees on top.'"

The second priority is replanning of land use. The British agriculturalists introduced the idea of forestry: planting one species of tree everywhere to get timber (monoculture). "But the main product of hills is water, not timber. With monoculture the purity of water is spoiled and it becomes acidic. The broad leafed species of trees have roots which purify the water. The forest is the mother of rivers. If you destroy the forest there will be no rivers. With population expansion it is very difficult to go back. Once nature is destroyed it is very difficult to regenerate.

Another benefit of mixed forests is sustainability. "We don't need timber trees which are cut and sold for money, but trees for sustenance which provide nuts, food and fodder so that villagers can prosper. This way the country will get ecological prosperity. In temperate climates, especially, plants grow very slowly. So instead of investing money in big dams, give, or loan the money to plant trees. The money can easily be paid back, if the right trees are in place. The walnut has a life of at least 200 years. 100 grams of walnut is equivalent to 500 grams of meat. There are medicinal trees, and trees like the chestnut which can provide food. We need to lay the foundation for a permanent economy."

Bahaguna feels that all the countries around the Himalayas should get together as their conditions are similar.

"We need a Himalaya policy." He stresses that a priority should be to keep the Himalayas worth living in. With migration the people lose not just their homes, but a whole way of life. "We need to use the resources for local self sufficiency. It's nonsense to export the resources and keep the people as paupers."

Spelt out like this, each bit of our ecological heritage can fit neatly in with the other. "The mountains are the water tower of humankind" says Bahaguna. "The Ganga and the Himalaya are a unique heritage for the world. Today our so-called growth has led to war, pollution, depletion of resources and hunger. The gap between the rich and poor is increasing. We are sowing the seeds for change. We have to rethink our priorities."

Sujaya Misra is a freelance journalist and *People and the Planet* correspondent in Delhi.

Lorna Stockman

Associates' news

BEIJING: A WATERSHED FOR EQUALITY

UN

When the Fourth UN Conference on Women ended on 15 September, participants and observers alike referred to it as an important move forward. The Conference's Platform for Action, which was painstakingly debated by some 5,000 government delegates from 189 countries, was called a watershed for women's equality.

The document makes strong advances on a number of contentious issues including the recognition of reproductive rights as human rights and the recognition that women's rights and needs in relation to their sexuality can be separate and distinct from those which relate to reproduction. It condemns discrimination against the girl child in regard to education and health care and in harmful practices such as female genital mutilation. The Platform for Action also addresses, in the strongest terms, the issue of violence against women, particularly against marginalized women – migrants, displaced refugee women, and women in situations of armed conflict.

Ingar Brueggemann, newly appointed Secretary-General of the International Planned Parenthood Federation (IPPF), said the Federation applauded the attention given in the document to the plight of marginalized women. "We consider it a very encouraging first step that the governments of the world have agreed to recognize, protect and enhance the rights of the most vulnerable groups in our society."

Ms Brueggemann urged participants to find the political will as well as the commitment to provide the resources for turning the decisions to be taken by the Conference into worldwide action. The promises made by governments at the Cairo Conference were not followed by the allocation of resources from donor countries, and it became clear as the Beijing Conference concluded that the issue of funding remains a problem. IPPF believes that one of its main post-conference tasks will be to persuade governments to allocate the necessary monies to implement the Platform for Action.

For further information contact, IPPF, Regent's College, Inner Circle, Regent's Park, London NW1 4NS, UK .
Tel: 0171 486 0741 Fax: 0171 487 7950 E-mail: jhamand@ippf.attmail.com.

MATERNAL CARE

Pregnancy costs the lives of half a million women every year. Most of these deaths are avoidable. To test strategies for reducing maternal mortality, the Population Council initiated safe motherhood demonstration projects last year in three countries – Ecuador, Ghana and Vietnam.

This work reflects the Council's active participation in Safe Motherhood Initiative launched in 1987 by the World Health Organization, World Bank, United Nations Population Fund, and agencies from more than 45 countries with the goal of cutting maternal mortality rates in half by the year 2000.

The Council's Ghana demonstration project will compare the cost and efficacy of two perinatal care packages and determine which delivers appropriate care to the greater proportion of women having complicated and uncomplicated pregnancies. The first will offer clinical protocols and guidelines for maternity care; the second is a Life Saving Skills training programme for midwives.

The Vietnam project will evaluate the costs and effectiveness of upgrading emergency obstetric services at primary referral sites. In Ecuador, Population Council researchers will test ways to prevent unnecessary cesarean section in hospitals through changes in hospital policies and procedures.

These projects have already yielded useful results, including a method for rapidly evaluating the status of obstetric care and insights into why maternal mortality rates are so high.

For further information, contact the Population Council's New York office. Tel: 1 212 339 0500, Fax: 212 755 6052, or e-mail: pubinfo@popcouncil.org

NETWORKING

To most of the developing world, the 'information superhighway' has, so far, been more of a bypass. Now those working to promote global justice are getting together on the Internet to pool their resources to make a real difference.

At the centre of this partnership is OneWorld Online, a British-run site on the most accessible part of the Internet – the World-Wide Web. The brainchild of a group of television broadcasters, it aims to bring the poor and rich parts of the world together. All the partners on OneWorld Online share a simple aim: to create a meeting place on the Internet where everyone who cares about world development can reach each other easily. For this purpose, OneWorld has a common gateway and common index.

The idea has really taken off. The Carter Center in Atlanta, checks into the OneWorld site when it needs to brief President Carter urgently on Third World issues. And an independent consultant to the British Government declared: "This is Net publishing at its best."

The US Internet Multicasting service is in the process of mirroring the OneWorld site. In Britain, all the major human rights and development charities and NGOs are partners in the project.

OneWorld Online is now the biggest independent site on the Web devoted to human development issues. In the seven months since its launch, it has clocked up over three-quarters of a million accesses.

The OneWorld idea is spreading to the rest of the world. The European Centre for Development Policy Management (an advisory body guiding governments on their development policies) has joined, with its African, Caribbean and Pacific connections.

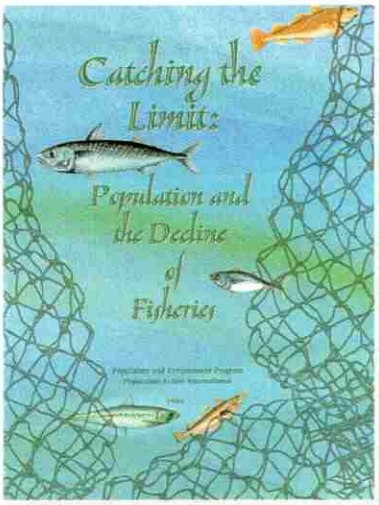
Anyone with access to the World-Wide Web can read OneWorld' Online's pages free. This includes extracts from *People & the Planet* , which is one of the founder-partners. *People & the Planet* also has its own Web site within the OneWorld Online system: http://www.oneworld.org/patp/

For more information about OneWorld Online
Tel: 01494 481629, Fax: 01494 481751,
E-mail: justice@oneworld.org
URL: http://www.oneworld.org/

FISHING LIMITS

The continuing growth in the world's population and a corresponding rise in demand for fish threaten to push this valuable source of protein out of reach for the nearly one billion people – most of them poor – who rely on fish as a principal source of animal protein, according to a new report by Population Action International (PAI).

According to the new study, *Catching the Limit: Population and the Decline of Fisheries*, population growth



will especially strain the availability of fish in developing nations, where more than 700 million people already cannot obtain sufficient calories and nutrients to lead healthy and active lives.

"At the moment, population growth is fuelling about two-thirds of the current growth in demand for fish," says Robert Engelman, co-author of the study and director of PAI's Population and Environment Program. "As population pressures on this resource grow, fish prices will continue to climb, further reducing consumption among the poor. In the next century, many species of fish will become luxuries only the well-to-do can afford."

The global fish catch peaked in 1989 at 89 million metric tonnes and has hovered at around 85 million tonnes since then. The UN Food and Agricultural Organization (FAO) estimates that nearly 70 per cent of the world's conventional fish species – such as cod, hake and haddock – are already fished up to or beyond sustainable limits.

Sound conservation and management strategies are central to ensuring the future health of the fisheries and the sustainability of fish catches, according to the PAI study. Early stabilization of world population would ease all aspects of managing the world's fisheries into the 21st century and beyond. In the area of fisheries management, experts recommend that governments:

- reduce the throwing away of unwanted fish by encouraging methods that discriminate between target and non-target species;
- improve storage and distribution technologies to reduce post-catch losses;
- eliminate subsidies that support overcapacity in the fishing industry (the world's fishing fleet has doubled its size since 1970);
- protect coastal and other fishery habitats by controlling development and pollution.

"The Food and Agricultural Organization estimates that 60 million tonnes of fish is the maximum sustainable harvest of wild fish that can be captured for human consumption," says Engelman. "The international community – and individual nations – will have to work hard to ensure that we respect what appear to be the natural limits to fish catches."

Copies of the study are available for purchase from PAI, 1120 19th Street NW, Suite 500, Washington DC 20036.
Tel: 1 202 659 1833, Fax: 1 202 293 1795.

HELPING ADOLESCENTS

The Center for Development and Population Activities (CEDPA) has launched an adolescent reproductive health care project in Sub-Saharan Africa with support from the UN Population Fund (UNFPA). The region has the world's highest adolescent fertility rate.

The project aims to protect and promote the rights of adolescents to reproductive health information and services. Gender differences in reproductive issues will be addressed in all activities to foster shared responsibility among women and men for reproductive health.

Needs assessments are being conducted in 10 countries and pilot projects are underway in Ethiopia, South Africa, Cameroon and Mali. A regional training of trainers workshop will be held for non-governmental organization managers from the Anglophone and Francophone Africa, in Kenya in 1996 and a youth forum highlighting the concerns of youth will be held in Uganda in February.

For further information contact, Belkis Giorgis, CEDPA, 1717 Massachusetts Avenue NW, Suite 200, Washington DC, USA.
Tel: 1 212 667 1142, Fax: 1 212 332 4496,
Email: Belkis@cedpa.org.

ARAB CONFERENCE

The first Population Conference for the Arab World organized by the International Union for the Scientific Study of Population is scheduled to take place in Cairo in December 1996.

The co-sponsoring organizations are the Arab Demographers' Association, the Cairo Demographic Centre, the Economic and Social Commission for Western Asia, the League of Arab States and UNFPA.

Papers are acceptable in Arabic, English and French.

For further information contact, Bruno Remiche, IUSSP, rue des Augustins 34, B-4000 Liege, Belgium. Fax: 32 41 22 3847.

SAVING THE ALBATROSS

Concern is growing for the continued survival of more than 13 species of albatross and a number of other seabirds which frequent the Southern Oceans and the Pacific. The principle cause of this decline is know to be by-catch resulting from long-line fisheries.

Many albatross are killed as they are caught by the baits of long-line tuna fishing boats and drown. Currently, an estimated 44,000 albatrosses are killed each year from this alone (including an estimated 10 per cent of the world's Wandering Albatross).

WWF is calling on the Southern Ocean tuna fishing nations and the fishing industry to take measures that will dramatically reduce albatross deaths as a matter of international priority. "There is almost no time left to save this magnificent wanderer of the world's oceans." said Dr Ray Nias, Director of Conservation at WWF Australia. This organization recently completed a project to track the endangered Wandering Albatross and discovered that it achieves voyages of over 1,000 kilometres each day over open water.

Work to develop by-catch mitigation devices, such as tori poles (streamers that scare birds from the sinking baits) and night-setting is being carried out with some success. The use of such methods, and others such a closing off areas around breeding colonies, will be essential if the extinction of the albatross is to be avoided.

WWF UK Photo Library

For more information contact WWF Australia, Level 10,
8-12 Bridge Street,
Sydney, NSW 2000, Australia.
Tel: 61 2 247 6300, Fax: 247 8778.

Associates' News is compiled by **Maya Pastakia** to whom all contributions should be addressed.

Film: LADAKH LESSONS

Isolated for centuries, it is only in the last decade that the mountainous region of Ladakh in Northern India has been made accessible by road. *Ancient Futures: Learning From Ladakh* is a one-hour documentary exploring how outside influences have radically changed the face of the region in just a few years and what lessons can be learnt from this stark example of 'progress'.

Perched in the Himalayas, on the western edge of the Tibetan plateau Ladakh is one of the highest and most arid inhabited regions on earth. Yet for over 1,000 years, Ladakhis have managed not just to survive but to prosper. Despite the meagre rainfall and short growing season, they have always managed to produce more than enough food, surpluses being traded for salt or tea. An intricate system of channels brings glacial melt water to the fields to be shared out equitably. Centuries of scarcity have honed traditional Ladakhi culture into one where nothing is wasted, land is carefully protected and even population is controlled. Here, economic life, the need to conserve and share resources for mutual survival, underpinned a stable community with strong ties between family, neighbours and villages.

But, in little more than a decade, modern influences have made deep in-roads into Ladakh's traditional culture threatening the delicately balanced social and ecological structures. Linking Ladakh to India's western plains, new roads not only bring in trucks and buses laden with hitherto unknown consumer goods but notions of Western- style progress and development.

The new cash economy encourages people to leave the land in search of paid employment and the capital, Leh, is growing exponentially with squalid housing colonies sprawling towards the desert. The rural economy is undermined as the market is flooded with cheap grain imports. Rubbish, once unknown in Ladakh, litters the streets of the capital, and precious water supplies are contaminated with sewage and pollution.

Now that survival no longer depends on close co-operation within the community, social problems – violence, crime and ethnic intolerance – are on the increase. Most importantly, the old knowledge-systems which upheld sustainability and self-reliance are slowly being forgotten. Education used to prepare children for life in a finely balanced environment - how to grow food, build houses and make clothes. Now the school curriculum aims to teach children how to live in an industrial society.

In highlighting the social and environmental consequences of Ladakh's rapid transformation, *Ancient Futures* questions the nature and value of 'progress', not just in the developing countries but in the industrialised world as well.

Film: HIDDEN VALLEYS

When China and Pakistan cemented their strategic alliance in the 1970s by building the Karakorum highway, centuries of isolation in the feudal valleys of north Pakistan came to an end. In 1983 the Aga Khan, spiritual leader of the Ismailis among the valley dwellers, established a rural support programme to help them exploit opportunities opened up by the new highway to become self-sufficient.

In ten years, over 2,000 village organizations have sprung up to oversee projects ranging from irrigation channels and food preservation to the education of women. But as Paul Clearey enthralling film makes clear, progress has also brought tensions. The new road is making demands on the peoples of Gilgit, Hunza and Nagar as surely as their feudal lords once did, remorselessly changing patterns of life.

Nick Rance

Ancient Futures: Learning from Ladakh and *Highway to the Hidden Valleys* are available from TVE, Prince Albert Road, London NW1 4RZ, UK.
Tel: 44 (0)171 586 5526
Fax: 44 (0)171 586 4866

Neil Cooper/ Panos Pictures

Sarita and Jules Cowan/Panos Pictures

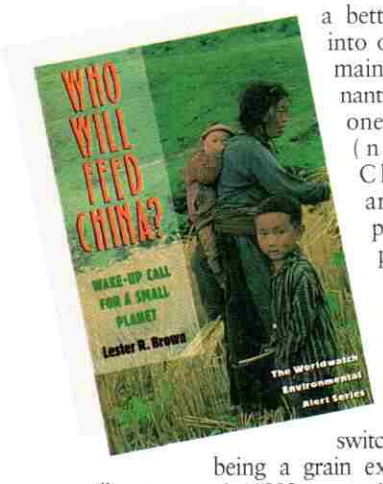
FEEDING CHINA

Who will feed China?

Lester R. Brown

W. W. Norton, New York, 1995, $8.95 pb

Subtitled "Wake-up Call for a Small Planet" this latest offering by Lester Brown is perhaps his best of all. It is a short (163 pages), succinct in its analyses, and super-pointed in its conclusions. Do read it, and lend it to your friends, emphasizing to them that it would be hard to find a better insight into one of the main determinants of everyone's future (not just China's), and for a piffling price.



The opening message is that China has switched from being a grain exporter, 8 million tonnes in 1992, to a net importer, 16 million tonnes in 1994. This sudden change has been enough to drive up grain prices in China's major cities by a whopping 60 per cent.

More significant still is how the switch features within the global grain market, with some 200 million tonnes of exports per year. Assume three things. First, that China's population growth will remain low with only (sic) 13 million additional people a year. Second, that there will be no further improvements in the Chinese diet. Third, that China's industrialization and housing programmes will keep on gobbling up precious croplands. This all means that population growth alone would leave China needing to import 200 million tonnes by the year 2030. Suppose, however, that Chinese diets improve from 300 kilogrammes of grain per head per year to 400 kilogrammes, as is the case in Taiwan today (contrast US consumption, 800 kilogrammes) by the year 2030. This would mean that China would need to import 370 million tonnes of grain.

Where would that much grain come from? While world grain harvests will keep on increasing, the critical factor is per capita production – which has actually been declining a little throughout the past ten years. By 2030, many other countries are likely to be competing in the global grain arena, and China may find itself paying dearly for its food shortfalls. In turn, this would generate all manner of knock-on effects for the rest of us, in the form of ever-higher grain prices.

Not everyone agrees with Brown's calculations. The International Food Policy Research Institute, for one, takes a more sanguine view. So does the Chinese government, though interestingly it has moved rather closer to Brown's view than its first outraged reaction. Whatever one makes of the prospect, it behoves us all to recognize that we may be heading toward a world of unprecedented upheavals as we strive to meet that most basic of needs: supper on the table.

To repeat: this book is a thoroughly good buy, and an even better read. As the Chinese would say, though not favourably, we have exciting times ahead of us.

Norman Myers. Dr Myers is Visiting Fellow, Green College, Oxford University, England.

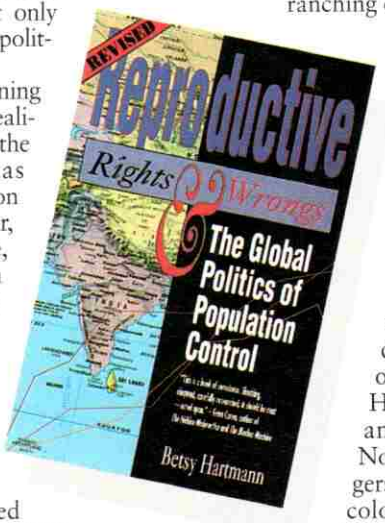
RIGHTS AND WRONGS

The Global Politics of Population Control

Betsy Hartmann

South End Press, Boston, 1995, US$18.00 pb

The central thesis of this book is that the concentration on 'population control' dangerously obscures the real causes of the earth's afflictions. From this viewpoint, rapid population growth is not a cause of underdevelopment; it is a symptom of the slow pace of social reform. And if pro-choice supporters turn a blind eye to coercive population control practices, they allow the anti-abortion movement to capture the issue and to posture as champions of individual reproductive freedom. "Such an abdication of responsibility is not only ethically bankrupt, but politically disastrous."



This is a useful warning but it ignores today's reality and the fact that the population debate has moved on. Population growth is one factor, albeit a significant one, in the deterioration of our planet. Today's family planning programmes are concerned with the reproductive health and rights of women and many organizations, the International Planned Parenthood Federation (IPPF) among them, are leading the campaign in this direction. And, with some exceptions, it is surely no longer true to say that counselling, follow-up, the provision of a range of contraceptive options and information on risks and benefits are secondary concerns to the achievement of acceptor targets.

If Betsy Hartmann has actually read *People & the Planet* she would have realized this. Instead, she cites this journal as "the ultimate example of the damaging merger between the population establishment and the environmental mainstream."

Although the book has been well researched and contains many observations on economic and social injustices with which no one would quarrel, factual errors abound. IPPF was established in 1952, not 1948, and an early ruling of its Governing Body prevented it from accepting more than 40 per cent of its funds from any one source, i.e. the United States. With its prestigious international medical panel, IPPF can hardly be accused of "taking an incautious attitude to contraceptive safety." In her attack on the central role of the United States in 'population control', she considers IPPF part of the plot and ignores its Third World roots.

Frances Dennis. Frances Dennis was formerly Director of Public Affairs at IPPF.

EQUITY AND ENVIRONMENT

The Social Causes of Environmental Destruction in Latin America

Michael Painter, William H. Durham, eds.

University of Michigan Press, Ann Arbor, 1995, US$22.00

Three case studies from Central America, three from Bolivia and Peru, and two essays, all by anthropologists, argue forcefully that "the crucial issue underlying environmental destruction in Latin America is gross inequity in access to resources."

A Costa Rican study deftly refutes the 'hamburger thesis' that deforestation was caused primarily by cattle ranching of beef for export. A fine study of the switch from cotton cultivation to shrimp mariculture and irrigated melons in Southern Honduras has resulted in a 'pesticide treadmill'.

Indians do much better than colonists in the Peruvian Amazon at preserving forests due to their family-orientated agriculture. However, in Bolivia and the Peten region of Northern Guatemala loggers, ranchers, impoverished colonists, and displaced Indians are following their own rational, short-term interests to cut trees in spite of donor projects and government rhetoric.

Policies designed to create national parks and forest reserves are not working in the face of increasingly mobilized Indians, colonists and commercial interests. Population pressures, inappropriate technologies, and world markets are not – in this volume – the factors driving environmental destruction. Instead "social relations are an important cause of environmental destruction in Latin America."

Aaron Segal. Dr Segal is Professor of Political Science, University of Texas, El Paso.

ISSN 0968-1655

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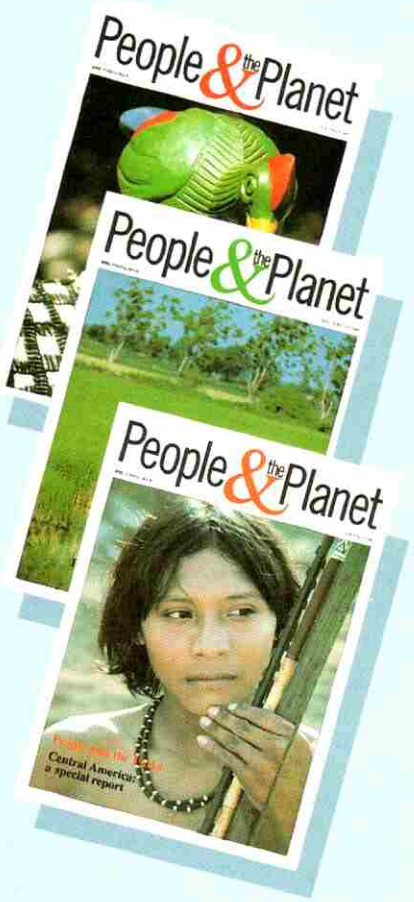

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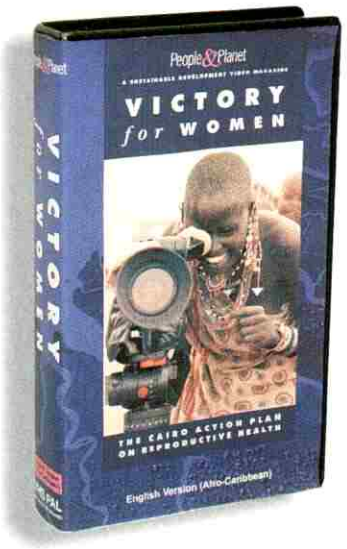

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E-mail: jhamand@ippf.attmail.com. and on the World Wide Web at the following URL address: http://www.oneworld.org/patp/
Annual subscription: US$25/15, or £12 (UK only) including postage, payable to Planet 21 at the address above

Printed in England on paper made from bagasse (sugar cane waste) and about one-third softwood pulp from sustainably managed plantations, by The Lavenham Press Ltd.